EFFECT OF SORGHUM BRAN ADDITION ON LIPID OXIDATION AND SENSORY PROPERTIES OF GROUND BEEF PATTIES DIFFERING IN FAT LEVELS

A Thesis

by

SUSAN PATRICIA HEMPHILL

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

August 2006

Major Subject: Nutrition

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ABSTRACT

Effect of Sorghum Bran Addition on Lipid Oxidation and Sensory Properties of Ground Beef Patties Differing in Fat Levels. (August 2006)

Susan Patricia Hemphill, B.S., Colorado State University

Chair of Advisory Committee: Dr. Rhonda K. Miller

Oxidation of lipids influences the color and sensory qualities of meat products. Meat with a high fat content, such as ground meat, is susceptible to lipid oxidation that leads to the development of negative flavor and color changes. Antioxidants, such as butylated hydroxanisole (BHA), butylated hydroxytolune (BHT) and extracts of rosemary, are used in meat products to control the effects of lipid oxidation. Awika (2000, 2003) found that sorghum bran phytochemicals have high antioxidant properties. Our objective is to evaluate the pH, color, sensory and antioxidant effect of 10, 20 and 30% ground beef patties containing rosemary, BHA/BHT, and three levels of sorghum bran during 5 d of aerobic storage at 4°C.

Beef trimmings containing either 50% or 90% lean were formulated into three meat blocks containing either 10, 20 or 30% lipid. Within a fat content, ground beef was equally divided into one of six treatments: 1) control-no added ingredients; 2) BHA and BHT at .01% of the meat weight; 3) rosemary at 0.2% of the meat weight; 4) high level of sorghum at 1.0% of the meat weight; 5) medium level of sorghum at 0.5% of the meat weight; and, 6) a low level of sorghum at 0.25% of the meat weight. The ground beef was aerobically packaged and stored for 0, 1, 3, or 5 days at 4°C. pH, thiobarbituric acid reactive substances (TBARS), fatty acid methyl esters (FAME), sensory color, Minolta color space values and descriptive sensory evaluations were determined.

Antioxidant addition reduced TBARS values and increased hardness ($P<0.020$) and springiness ($P=0.002$) over time compared to controls. The addition of the high sorghum bran level resulted in lower raw color scores (2.0 vs. 2.9) ($P<0.0001$) and slightly increased bitter basic taste (2.47 vs. 2.65) ($P=0.0069$) when compared to control patties. The high sorghum level slightly increased pH (6.33 vs. 6.41) ($P<0.0001$) and resulted in darker ($P<0.0001$) and less yellow colored ($P<0.0001$) patties. With storage, patties had higher pH ($P<0.0001$) and color space values decreased ($P<0.0001$). Sensory properties of the patties differed across fat levels ($P<0.05$); however, interactions between fat level and antioxidant treatment were not significant ($P>0.05$).

Moreover, the addition of sorghum bran at low levels can retard oxidative rancidity in ground beef patties without causing detrimental color changes and negatively affecting sensory attributes.

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CHAPTER I

INTRODUCTION

The meat industry strives to produce and deliver consistent, wholesome, high-quality products for retail purchase. To do this, the industry must protect the quality of the product as it moves through production, transportation, and distribution to the consumer. The urbanization of society has required that products survive a longer transportation time and extended shelf-life. Consumers are also becoming more quality orientated and health conscious in selecting food products. The meat industry, therefore, is faced with the challenge of supplying higher-quality foods able to endure various chemical and physical abuses during production and delivery to consumers (Han and Rhee, 2002). One of the major sources of change that occurs during processing and distribution of meat is lipid oxidation. Oxidation of lipids influences the nutritional, safety, color, and sensory qualities of food products. Increasing the degree of unsaturation of muscle membranes reduces the oxidative stability of the muscle, making it more susceptible to oxidative damage (Kanner, 1994). Meat with a high fat content, such as ground meat, sausages, and bacon, are susceptible to lipid oxidation which leads to rancidity and noticeable negative flavor and color changes. The ratio of polyunsaturated fatty acids (PUFAs) to saturated fatty acids in the meat will greatly influence the rate of oxidation and shelf-life of the product (Morrissey et al., 1998).

With the need to extend shelf-life and sustain the quality of products, antioxidants are being used by the meat industry to control the effects of lipid oxidation.

This thesis follows the style and format of the Journal of Animal Science.

To meet the needs of health conscious consumers, the meat industry is working to utilize natural antioxidants as opposed to synthetic compounds such as butylated hydroxanisole (BHA) and butylated hydroxytoluene (BHT). Naturally occurring inhibitors of oxidation in food generally originate from phenolic compounds found in plant-based sources (Shahidi, 2000). Both epidemiological and clinical studies have provided evidence that natural phenolic antioxidants are contributing factors for decreased incidences of chronic and degenerative diseases. The use of natural antioxidants as ingredients in food is needed to stabilize products against oxidation and to take advantage of their perceived health benefits (Shahidi, 2000; Finley and Given, 1986).

Many sources of antioxidants of plant origin have been investigated in recent years. Awika (2000, 2003) studied sorghum bran and found that it is a rich source of various phytochemicals and that is has high antioxidant activity relative to other cereals and fruits. The antioxidant activity of sorghum bran can be attributed to its rich source of polyflavans (condensed tannins and anthocyanins). Polyflavan molecular properties such as the degree of polymerization, molecular weight (MW) profiles, and composition of lipophilic and hydrophilic components determine the antioxidant activity in different solvent systems (Shahidi, 2000). The anthocyanin components of sorghum could possibly inhibit the oxidation processes that are water-based such as the reaction with myoglobin. The tannin components could possibly inhibit the lipid oxidation of the fat-soluble or phospholipids compounds in meat (Jenschke, 2004).

We hypothesized that the antioxidant activity of sorghum bran to reduce lipid oxidation and stabilize color would be affected by the fat level in the ground beef. The antioxidant activity would be most effective at lower levels of lipid content; however this study would help to determine at what fat levels the sorghum bran is an effective antioxidant.

The objective of this study was to evaluate ground beef patties that have been prepared with different treatments of synthetic and natural antioxidants. This study evaluated the effectiveness of sorghum bran antioxidant activity with varying levels of lipids. Comparative determinations were made by measuring oxidative rancidity, pH, color stability, fatty acid profiles, and sensory characteristics of the ground beef patties. Knowledge from this study will enable future commercial application of sorghum bran varieties as targeted food ingredients to improve food quality and human health.

CHAPTER II

LITERATURE REVIEW

Lipid Oxidation

Oxidation of lipids is a major cause of deterioration in the quality of meat and meat products. The lipid oxidation process causes deterioration in flavor, color, texture, nutritive value, and the production of toxic compounds (Kanner, 1994). The process involves reduced derivatives of oxygen called free radicals. The reduction of oxygen yields several products such as superoxide anion radical ($O_2^{-\cdot}$), perhydroxyl radical ($HO_2^{-\cdot}$), hydrogen peroxide (H_2O_2), and hydroxyl radical ($HO^{\cdot}$), all of which participate in the oxidative processes in meat. Free radicals can exist independently for a brief time, but having one or more unpaired electrons makes them very unstable and highly reactive. These compounds are produced under normal biological conditions of anaerobic metabolism, peroxidomal enzymes, and cytochrome P_{450} mixed-function oxidases. These free radicals are responsible for oxidizing lipids, proteins, nucleic acids, and other macro-molecules leading to cell death and tissue damage (Kanner, 1994; Morrissey et al., 1998).

Unless mediated by other oxidants or enzymes systems, oxidation undergoes a free radical chain reaction mechanism involving three stages: initiation, propagation, and termination. During the initiation stage, a hydrocarbon loses a hydrogen to form a fatty acyl radical. Unsaturated and polyunsaturated fatty acids are more susceptible to this step due to the presence of double bonds. This reaction can be illustrated as follows:

$$RH + O_2 \rightarrow R^{\cdot} + OOH^{\cdot}$$

$RH \rightarrow R^{\cdot} + H^{\cdot}$ (Morrissey et al., 1998)

The initiation reaction is triggered by radicals or other transition metal-oxygen complexes such as iron or copper. Each initiation process produces two free radicals, each of which participate in the chain reaction mechanism.

Propagation begins when the fatty acyl radical reacts rapidly with O_2 at the double bond of a fatty acid to form a peroxyl radical and propagate the fatty acid oxidation chain reaction. The peroxyl radical is more highly oxidized than the fatty acyl radical and will preferentially oxidize other unsaturated fatty acids and polyunsaturated fatty acids (Buettner, 1993). This is illustrated by the following:

$R^{\cdot} + O_2 \rightarrow ROO^{\cdot}$

$ROO^{\cdot} + R_1H \rightarrow ROOH + R_1^{\cdot}$ (Morrissey et al., 1998)

The lipid hydroperoxide (ROOH) produced during the propagation of the chain reaction will further react with transition metals, Fe^{+2} and Cu^{+}, to form peroxyl and alkoxyl radicals ($RO^{\cdot}$). Fe^{+2} and Cu^{+} reductively cleaves ROOH as follows:

$Fe^{+2} + ROOH \rightarrow Fe^{+3} + RO^{\cdot} + OH^{-}$

$Fe^{+3} + ROOH \rightarrow Fe^{+2} + ROO^{\cdot} + H^{+}$

$Cu^{+} + ROOH \rightarrow Cu^{+2} + RO^{\cdot} + OH^{-}$

$Cu^{+2} + ROOH \rightarrow Cu^{+} + ROO^{\cdot} + H^{+}$ (Morrissey et al., 1998)

Termination is the final stage in lipid oxidation. During this stage, two radicals interact and form less reactive by-products such as aldehydes, alcohols, and hydrocarbons. When there are no radicals available to interact with oxygen, initiation of lipid oxidation ceases. Termination reactions are as follows:

$R^{\cdot} + R^{\cdot} \rightarrow RR$

$ROO^{\cdot} + ROO^{\cdot} \rightarrow ROOR + O_2$

$RO^{\cdot} + R^{\cdot} \rightarrow ROR$

$ROO^{\cdot} + R^{\cdot} \rightarrow ROOR$

$2RO^{\cdot} + 2ROO^{\cdot} \rightarrow 2ROOR + O_2$ (Morrissey et al., 1998)

Lipid oxidation takes place in two different lipid fractions in meat, triacylglycerols and phospholipids. The rate of oxidation is directly effected by the number and configuration of the double bonds in a fatty acid. As the number of double bonds increases, lipid oxidation also increases. Fatty acids in the *cis* arrangement oxidize faster than similar fatty acids in the *trans* arrangement. Triacylglycerols are largely composed of straight-chain, even numbered carbon fatty acids. Phospholipids contain a much larger proportion of C20 and C22 unsaturated fatty acids. Polyunsaturation of the phospholipids fraction is about 15 times greater than that of the triacylglycerol fraction (Morrissey et al., 1998). Oxidative stability of meats is related to the degree of saturation of the lipid fraction. Oxygen attacks a double bond in the fatty acids to form peroxide linkages. Therefore, phospholipids containing a high content of unsaturated fatty acids have decreased oxidative stability due to the easily oxidizable bis-allylic hydrogens ($E^o = +600$mV compared to ≈ 1900mV for an aliphatic hydrogen) (Buettner, 1993). Previous studies showed that the ratio of PUFA to saturated fat is highest in fish making them the most susceptible to lipid oxidation followed by poultry, pork, beef, and lamb (Wilson et al., 1976; Pearson et al., 1977). Grinding of meat tissues is a common processing practice in today's meat industry. Ground beef is a very important beef product. Annual per capita beef consumption n the U.S. is approximately 30 kg, of which 45% is ground beef (American Meat Institute, 1993). This process disrupts the tissue layers and exposes the phospholipid layer to oxygen and other pro-oxidant ions resulting in an increased rate of oxidation (Pearson et al., 1977; Shahidi, 1994).

Effects of Lipid Oxidation on Meat Quality

The catalytic oxidation of lipids in biomembranes changes many characteristics of meat such as flavor, color, texture, and nutritive value. One of these major changes is the rapid development of rancid flavors and odors in the fat. Warmed over flavor (WOF), first recognized by Tims and Watts (1958), is the term given to describe the off-flavor and odor development in cooked meat products during storage. Warmed over flavor in meat was described to have a “cardboard-like”, “stale”, and “rancid” flavor (Vega and Brewer, 1994). The numerous hydroperoxides generated in the termination phase of lipid oxidation decompose to create a wide range of carbonyl compounds, hydrocarbons, funans, and other material that contribute to flavor deterioration (Kanner, 1994). Studies have attributed WOF to the lipid oxidation that occurs in the phospholipid membrane (Pearson et al., 1977; Igene and Pearson, 1979). Gas chromatography-olfactory (GC-O) analysis of volatiles follows the development of off-flavor compounds causing WOF (Dupuy et al., 1987). The GC-O method is strictly used to determine the compounds responsible for change in aroma (Marsili, 1997; 2002). Using this method of analysis, researchers have discovered hexanal and trans-4, 5-epoxy-(e)-2-decenal as the primary contributors of WOF.

The color characteristic in meat also changes in response to lipid oxidation. Consumers use color to judge freshness and quality of raw meat. The bright, cherry red color of beef considered desirable by consumers is called oxymyoglobin. The appeal of fresh meat decreases as the cherry-red oxymyoglobin is oxidized to the red-brown metmyoglobin (Enser, 2001). Metmyoglobin forms when oxymyoglobin losses an oxygen and ferrous iron losses an electron, changing the light absorption properties of the molecule. The myoglobin pigment in the meat goes from bright red to dark red and then to brown (Kanner, 1994; Enser, 2001). Lipid oxidation increases the rate of metmyoglobin formation and conversely metmyoglobin acts as a catalyst of lipid oxidation. One study (Anton et al., 1996) found that lipid oxidation and metmyoglobin levels were closely correlated in beef muscle displayed under O_2 permeable film. Replacement of the atmosphere with carbon dioxide and protection from light and low temperatures are methods of pigment protection from lipid oxidation (Anderson et al., 1988, 1990).

Oxidized lipids can react with proteins causing the formation of cross links and chemical modifications of side chains. Roubel and Tappel (1996) observed sevenfold increases in molecular weight when proteins were exposed to oxidizing lipid systems. It was suggested that lipid oxidation free radicals served as initiators of the polymerization. Roubel and Tappel (1996) also observed substantial loses in amino acids. They reported that methionine, cysteine, histadine, and lysine were the most vulnerable to damage. These observations are important because they suggested that moderate levels of lipid oxidation can cause significant reduction in the nutritional quality of proteins in the system.

In addition to changes in flavor, color, texture, and degradation of proteins, lipid oxidation results in considerable generation of toxins. Consumption of oxidized lipids is directly associated with the etiology of several chronic diseases including cancer and cardiovascular disease (Addis and Park, 1989). The free radicals generated in the oxidation process co-oxidize several vitamins and other molecules. Studies show that as the oxidation of phospholipids proceeds, the cholesterol component of phopholipid-rich muscle membranes is attacked by free radicals produced (Addis, 1986; Pearson et al., 1977). This forms a class of compounds which induce arterial injury and atherosclerosis. The major compounds involved in endothelial damage are aldehydes, fatty acid hydroperoxides, and cholesterol oxidation products. Numerous reports exist in which the occurrence of rancidity in foods assures that the diet induces plentiful supplies of fatty acid hydroperoxides. Nishigki et al. (1984) found that cholesterol oxidation products and fatty acid hydroperoxides can promote plaque accumulation as well as be an initiator of atherosclerosis. These compounds were reported to stimulate arterial smooth muscle cells and macrophages to form lipid-laden cells (Yagi et al., 1987). These compounds cause marked damage to endothelial cells, including holes in many cells and denucleation of some. They also inhibit prostacyclin synthesis by the artery, promoting atherosclerosis (Sasaguri et al., 1985).

Application of Antioxidants

Based on the flavor, color, textural, and nutritive losses that can occur in meat, there is a critical need to inhibit lipid oxidation. Antioxidants are chemical compounds which can delay the onset or slow the rate of lipid oxidation, protecting the lipid components in food from quality deterioration. Antioxidants act as free radical scavengers through different mechanisms and in different compartments. The antioxidant activity of a particular compound is related to its ability to: (1) neutralize free radicals; (2) reduce the peroxide concentrations and repair oxidized membrane; or (3) act as a metal chelator to quench iron and decrease free radical production. The major antioxidants used in foods are monohydroxy or polyhydroxy phenol compounds with various ring substitutions. These compounds have low activation energy to donate hydrogen to free radicals. The resulting antioxidant free radical ($A^{\cdot}$) is not subject to rapid oxidation and does not initiate another free radical due to the stabilization of delocalization of the radical electron. The antioxidant free radicals can also react with lipid free radicals ($R^{\cdot}$, $RO^{\cdot}$, $ROO^{\cdot}$) to form stable, complex compounds which will not initiate a new chain reaction. The reactions of antioxidants with radicals are as follows:

$R^{\cdot} + AH \rightarrow RH + A^{\cdot} \quad \rightarrow \quad R^{\cdot} + A^{\cdot} \rightarrow RA$

$RO^{\cdot} + AH \rightarrow ROH + A^{\cdot} \quad \rightarrow \quad RO^{\cdot} + A^{\cdot} \rightarrow ROA$

$ROO^{\cdot} + AH \rightarrow ROOH + A^{\cdot} \quad \rightarrow \quad ROO^{\cdot} + A^{\cdot} \rightarrow ROOA$

The major synthetic antioxidants in common food used are BHA (butylated hydroxyanisol), BHT (butylhydroxytoluene), TBHQ (tert-butylhydroquinone), and PG (propyl gallate). Synthetic antioxidants have been used in food products since the

1940's. During this time, BHA and alkyl esters of gallic acid were found to be effective controls against oxidation. It also was made evident that the harmful propagation effects of the catalytic transition metals such as iron and copper had to be counteracted. These transition metals are volatile due to two or more valence orbitals that are available for free radicals to attach (Kanner, 1987). Thus, certain acids, such as CA (citric acid), EDTA (ethylene diaminetetra-acetic acid), or their derivatives in combination with phenolic antioxidants were found to act as metal deactivators or chelating agents. There is growing concern, however, regarding the inherent toxicity and possible carcinogenic effects of these synthetic antioxidants in foods. Therefore, there is a general desire to replace these common synthetic antioxidants with natural ingredients (Shahidi, 2000). Naturally-occurring inhibitors of oxidation generally originate from plant-based ingredients. The phenolic compounds found in plants provide a natural source of antioxidants for use in foods. Studies have shown the ability of these phenolic compounds to scavenge radicals, decompose them, quench singlet oxygen, and act as metal chelators. Natural antioxidants also exhibit a wide range of biological effects including antibacterial, antiviral, anti-inflammatory, antithrombotic, and vasodilatory actions (Cook and Samman, 1996). The phenolic compounds may be present together with its precursor(s) and reaction product(s). Thus, the mode of action of the natural sources of antioxidants may be varied and could involve multiple mechanisms of action (Shahidi, 1997).

Sorghum

With increased interest in the use of phenolic compounds as potential antioxidants, many studies have been done with different plant compounds. One compound that has been a target for research is sorghum. Sorghum is a cereal that contains various phenolic compounds. These phenols help in the plant's natural defense against pests, diseases, and other harmful external influences. The antioxidant activity of the sorghum is attributed to the phenolic compounds concentrated in the outer layers of the kernel (Awika, 2003). Awika (2000) found the sorghum fraction to possess antioxidant properties and health benefits comparable to those commonly associated with fruits. These compounds are both hydrophilic and lipophilic acting together to inhibit lipid oxidation more than conventional antioxidants. Due to its high agronomical and economical properties, sorghum has the potential to be a cost-effective source of antioxidants.

Sorghum Tannins

Condensed tannins are the major phenolic component found in some sorghum cultivars. In general, tannins are oiligomeric compounds of flavoiniod units, linked by carbon-carbon bonds not susceptible to cleavage by hydrolysis. They are lipophilic, high molecular weight (M_r >500), and contain many phenolic hydroxyl groups (Bors et al., 2001). Compared to the simple phenols, previous research (Hagerman et al., 1998; Bors et al., 2000) indicated that tannins posses higher antioxidant activities. Hagerman et al. (1998) found tannins were15-30 times more powerful at quenching peroxy radicals and Bors et al. (2000) found tannins had increased free radical scavenging potential.

Other studies have found condensed tannins exert the following effects: inhibition of lipid peroxidation (Packer, 1993); scavenging of oxygen radicals (Husain et al., 1987; Chimi et al., 1991); and binding and inactivation of pro-oxidative metal ions such as iron and copper (Bors et al., 1990; Carbonaro et al., 1996). Tannins also have the ability to bind proteins and other macromolecules to form complexes resistant to digestion (Jimenez-Ramsye et al., 1994). These complexes of tannins with proteins, carbohydrates, and lipids may prevent oxidative damage in the digestive tract during digestion (Marshall and Roberts, 1990). To study this binding activity, Hagerman et al. (1998) used tannin-gelation complexes in a metmyoglobin assay and found that proteins bound to tannins were less susceptible to oxidative damage.

Sorghum Anthocyanins

Anthocyanins are natural, water-soluble, colorants belonging to the flavonoid family. In addition to their colorful characteristics, anthocyanins posses potent antioxidant properties. Anthocyanins are natural glycosides and acylglycosides of anthocyanidins (Wang et al., 1997). Most anthocyanins have an OH group on the C-3 of the carbon ring. There is concern with the use of anthocyanins as an antioxidant because of its stability. However, the anthocyanins present in sorghum lack the OH group on the C-3. These are referred to as 3-deoxyanthocyanins. The lack of OH on the C-3 makes these compounds more stable in acidic solutions. The 3-deoxyanthocyanins are the major antioxidant components in sorghum and contribute the greatest antioxidant activity (Awkia, 2003). The 3-deoxyanthocyanins present in sorghum are luteolinadin and apigenidin (Gous, 1989; Awika, 2003). Sweeny and Iacobucci (1981) found these compounds were stable under acidic conditions and in the presence of sulfur dioxide, a common food preservative (Harbone, 1988), compared to other anthocyanins commonly found in fruits and vegetables. Effective quantification of anthocyanins is hindered by the lack of appropriate standards, efficient extractions, and separation techniques. Gous (1989) reported that anthocyanin levels of 3.7 mg/g, on a dry weight basis, for a black sorghum whereas Awkia (2003) found black sorghum contained 4.5-11 mg/g. The difference in these values can be attributed to different extraction methods (Awika, 2003). Awika (2003) also reported anthocyanin levels of 3.6 mg/g for red sorghum and 1.8-4.3 mg/g for brown sorghum.

Anthocyanins are also associated with numerous therapeutic benefits including vasoprotective and anti-inflammatory properties (Lietti et al., 1976), anti-cancer and chemoprotective properties (Karaivanova et al., 1990), anti-neoplastic properties (Kamei et al., 1990), and hypoglycemic properties (Tsuda et al., 2003). The stability and potential health benefits of the 3-deoxyanthocyanins present in sorghum could provide an effective defense against lipid oxidation.

CHAPTER III

MATERIALS AND METHODS

To understand the effect of fat level and the ability of sorghum polyflavans to limit lipid oxidation, sorghum bran containing polyflavans were added to ground beef containing 10, 20, and 30 % fat. These fat levels are comparable to commercial ground beef patties merchandized in the food industry.

Beef trimmings containing either 50% or 90% lean at 2 days post-fabrication were purchased on one of three processing days from two commercial beef processors. The beef trimmings were formulated into three meat blocks containing either 10, 20 or 30% lipid (verified using the CEM Autoanalyzer) and ground (model 4046, Hobart manufacturing Co., Troy OH) through a 1.27 cm coarse ground plate. Processing was performed at the Rosenthal Meat Science and Technology Center at Texas A& M University. Processing day was defined as a replicate (block); three replicates were completed. Within a processing day and fat content, ground beef was equally divided into one of six treatments: 1) negative control-no added ingredients; 2) BHA and BHT (TENOX®, Eastman Chemical Products, Kingsport, TN) each added at .01% of the meat weight; 3) rosemary added at .20 % (Herbalox®, Type HT 25, Kalsec, Inc., Kalamanzo, MI) of the meat weight; 4) low level of sorghum at .25% of the meat weight; 5) medium level of sorghum at .5% of the meat weight; 6) and a high level of sorghum at 1% of the meat weight. The levels were based on demonstrated efficacy from preliminary data. A sumac bran sorghum grown in College Station in 2001 was decorticated using a PRL duhuller (Nutama Machine Co., Saskatoon, Canada). The bran particle size was reduced through a pin mill to pass through a 40 mesh tyler sieve.

Mixing was standardized for all treatments using a paddle hook mixer (model KM25GOX, KitchenAid®, St. Joseph, MI) at a predetermined time of 2 min. After mixing, the treatment mixtures were ground again through a 0.32 cm fine grind plate. Patties, 200 g, were hand formed using a standard patty mold (Tupperware™ Hamburger Press, Orlando, FL).

Two patties then were placed on a Styrofoam tray (CRYOVAC, Sealed Air Co., Saddle Brook, NJ) and over-wrapped with provinylchloride (PVC) film (Stretchable meat film 55003815; Prime Source, St. Louis, MO). Six packages within a treatment and fat level were made. Four packages were randomly assigned to a storage day (0, 1, 3, and 5) and displayed at 4°C. To avoid positional effects in the retail case, the packages were randomly assigned location across treatment and storage times and stored in a traditional coffin case (Model DM8-8398, Tyler Refrigeration Corporation, Niles, Michigan) under standard supermarket fluorescent lighting (Sylvania F40N, Osram Sylvania, Danvres, MA; Color Temperature = 3600K). Patties were continuously subjected to this lighting during the storage period and external light sources were eliminated. These storage conditions, while representing the most common retail system, create a model system sufficient to induce high levels of lipid oxidation in control samples. At each storage time, chemical and color analysis of pH, TBARS, sensory color, and Minolta color space values were evaluated. Two packages were randomly assigned to either 1 or 5 storage days for trained meat descriptive sensory evaluations.

Analytical Measurements

Objective color was measured using a Minolta Colorimeter (CR-300, Minolta Co., Ramsey, NJ). Each patty was evaluated at a standard time each evaluation day in the package to insure consistency among days. The Minolta colorimeter was calibrated each day using a white tile and PVC over-wrap. The same PVC over-wrap that covered the sample in the package covered the light portal during calibration. Each reading consisted of CIE L*, a*, and b* color space values. Three different readings were randomly taken from each patty's exterior surface. The average of the three readings was representative of a given patty.

Subjective color was determined by a six-member selected and trained descriptive attribute color sensory panel as defined by AMSA (1991, 1995). Panelists attended a training session to become familiar with the color scale that was used in the study. To insure consistency between training and actual testing, the same treatments were applied to the training patties and visual color cards were provided for each panelist. Each panelist used an eight-point scale to evaluate lean color (1 = very dark red; 8 = light, grayish red), percentage discoloration (1= 0%; 7 = 100%), and discoloration color (1 = very dark red; 8 = light, grayish red).

After color readings were recorded, each package was evaluated for patty exudate. Exudate was measured by weighing the PVC, Styrofoam tray over-wrapped patties, removing the two patties and weighing the package materials with the remaining exudates. Weight of the package materials alone was subtracted from both values to obtain the weight of the patties and the exudates. The following formula was used to calculate the amount of exudates as a percentage of patty weight:

$$(\text{weight of exudates}/\text{weight of patties}) \times 100$$

After exudate was measured, one patty per storage time and treatment was used for pH and TBARS evaluation. The ultimate pH of each patty was determined with a pH meter (HI 98240, Hanna Instruments, Italy) by taking the average of three pH readings at three random locations on the patty. The pH meter was calibrated using standard buffers at 4.0 and 7.0.

The quantity of malonaldehyde (MDA) or thiobarbituric acid reactive substances (TBARS) were measured as an index of lipid peroxidation within the treatment samples. MDA is a breakdown product of lipid hydroperoxides and largely reflect metabolic by-products of oxidation of polyunsaturated fatty acids (PUFAs). Under circumstances of increased oxidative stress, MDA would be expected to increase. Measurements of TBARS are based on the reaction of MDA with thiobarbituric acid. For our treatment samples, two 60 g samples were removed from each patty and blended with 90 ml of distilled water and 30 ml of a 0.5% solution of propyl gallate (PG) and ethylene diaminetetra-acetic acid (EDTA) for 2 minutes using a commercial blender (Hobart Co., Troy, OH). After blending, 30 g of the meat slurry was weighed into a 250 ml beaker. The slurry then was transferred to a 500ml Kjeldahl flask where the contents were rinsed into the flask using 77.5 ml of 50°C distilled water. Five to six boiling chips were added to the Kjeldahl flasks along with 2.5 ml of a 4N HCL solution. The neck of each

Kjeldahl flask was sprayed with 316 Silicone Release Spray (Dow Corning®, Midland, MI) to reduce the incidence of foaming. The flasks were placed on the distillation unit and distilled until 50 ml of the distillate was collected. Once cooled, 5 ml of the collected distillate was transferred to a test tube and 5 ml of a 0.02 M TBA solution was added. To develop the color, the test tubes were boiled for 35 min. The test tubes were then cooled for 10 min and then the solution was transferred in a standard 4.5 ml cuvette (VWM, West Chester, PA). Absorbance was measured at 530 nm using a DU-7 spectrophotometer (Beckman Instruments Inc., Fulerton, CA). The amount of mg malonaldehyde/ 1000 g sample was determined using TBARS procedures described by Tarladgis et al. (1960) as modified by Rhee et al. (1978).

For analysis of the fatty acid profiles of the total lipids, fatty acid methyl esters were prepared from the 10%, 20%, and 30% control patties from each replicate. One gram from each control patty stored at day 0 was added to a 50 ml tube for total lipid extraction and methylation by the method of Folch et al. (1957) and Morrison et al. (1964). Then 5.0 ml of chloroform:methanal ($CHCl_3$:CH_3OH, 2:1, v/v) was added and each sample tube was homogenized for 30 sec using a Polytron homogenizer. The samples sat for 30 min to extract the lipids. The homogenate was then filtered through a sintered glass filter funnel (Whatman filter apparatus using 2.4 cm GF/C filters) into another 50 ml centrifuge tube, 8 ml of 0.74% KCL was added to the samples and vortexed for 1 min. The samples sat for 2 hours to separate phases. The upper phase was carefully removed and discarded while the lower phase was transferred to a 20 ml glass tube. Using the N-Evap., the samples were evaporated with nitrogen to dryness.

To saponify the lipids, 1 ml of .5 N KOH in MeOH was added to each sample and heated in a 70°C water bath for 10 min, then 1 ml of 14% BF_3 in MeOH was added and the tubes were flushed with N_2, loosely capped, and placed in a 70°C water bath for 30 min. The tubes were then cooled, 2 ml of HPLC-grade hexane and 2 ml saturated NaCl added and the tubes vortexed for 1 min. Using a transfer pipet, the upper hexane layer was removed and transferred to a 20 ml tube with approximately 800 mg of Na_2SO_4. To the remaining saturated NaCl, 2 ml of hexane was added, vortexed, and allowed to settle. Using a pipet, the upper hexane layer was removed and transferred to the tube with Na_2SO_4 and briefly vortexed. The hexane from each tube was removed and placed in a labeled scintillation vial. The hexane was evaporated completely using the N-Evap. The lipids were reconstituted with the appropriate amount of hexane. Once approximately 50 mg/ml was obtained, 400 µL of the solution was transferred to a 2 ml autosample vial containing 1.6 ml of HPLC-grade hexane containing 5 mg C12 FAME. Approximately 1 µL of the final solution was injected in the gas liquid chromatograph. Analysis was done using a Varian gas chromatograph (model CP-3800 fixed with a CP-8200 autosampler, Varian Walnut Creek, CA). Separation of FAME was done on a fused silica capillary column CP-Sil88 (100 x 0.25 mm i.d.; Chrompack Middleberg, The Netherlands). Fatty acid composition in the control patties was determined by their elution order, first by carbon number and then by degree of unsaturation.

Sensory Measurements

Two patties per treatment were used for sensory evaluation. The patties were cooked to an internal temperature of 73° C on an electrical grill (Hamilton Beach™, Portfolio Grill, Washington, NC). Internal temperatures were monitored by a copper-constantan thermocouple (Omega Engineering, Stanford, CT) inserted into the geometric center of each patty. Once the internal temperature reached 35° C, the patty was turned and heated until the final temperature was achieved. The patty was then cut into eight equal wedges and served warm to the panelists, within 5 minutes post cooking. Each panelist received two wedges for evaluation. The panel consisted of a six member trained flavor and texture descriptive attribute sensory panel based on AMSA (1995) and Meilgaard et al. (1999). Flavor, basic taste, mouth feel, after-taste, and texture attributes were determined during ballot development sessions. The lexicon for warmed over flavor in beef was used as a basis for descriptive attributes (Johnson and Civille, 1986). Panelists were provided samples of ground beef patties similar to treatments defined in the study during ballot development sessions. After attributes for the ballot were defined, training sessions were conducted. The study was initiated after panelists could consistently and accurately identify sensory attributes (AMSA, 1995). To reduce bias and collaboration among the panelists, each panelist was seated in individual, partitioned booths equipped with red theater gel lights. Samples were served in a random order and identified using three-digit codes. Unsalted saltine crackers, ricotta cheese, and double distilled, deionized water was served to the panelists between samples to cleanse their palates. The panelists evaluated each sample using a 15-point universal scale with 0 =

none and 15 = extremely intense for attributes defined from ballot development sessions (AMSA, 1995).

On each sensory evaluation day, three sessions were conducted with six treatment samples evaluated per session. Panelists were given five minutes between samples to cleanse their palates and remove any remaining flavors from the previous sample. A twenty minute break was given between sessions to further cleanse their palates.

Statistical Analysis

Data were analyzed as a factorial arrangement by Analysis of Variance using the general linear model (GLM) procedure of SAS (Version 6.12, Cary, NC, 1998) with a predetermined significance level of $P \leq 0.05$. For the FAME data, fat level was defined as the main effect. For the chemical data, processing day, treatment, fat level, and storage day were defined as main effects. Two-way interactions for all main effects were examined and remained in the model if they were significant ($P < 0.05$). For sensory data, the data were analyzed to determine the effect of panel and panel interactions. As panel interactions were not significant, these data were then averaged across panelists and analyzed as defined for the chemical data. Least squares means were calculated and when differences were defined by Analysis of Variance, least squares means were separated using the STDERR PDIFF function.

CHAPTER IV

RESULTS AND DISCUSSION

Chemical Analysis

FAME

Fatty acids are the group of meat lipids possessing unique physical and chemical properties that influence meat stability. Lipids of animal origin, with the exception of fish oil, are more saturated and less polyunsaturated compared with lipids of plant origin. As oxidative stability of meats is related to the degree of saturation of the lipid fraction, determining fatty acid profile concentrations for total saturated (SFA), monounsaturated (MUFA), and polyunsaturated (PUFA) fatty acids facilitates an understanding of how the meat fat properties related to other factors, specifically lipid oxidation. Gas-Liquid Chromatographic (GLC) analysis of the fatty acid profiles is applicable to biological samples containing compounds with chain length in the range C14 to C24 (Jennings, 1987). In our study, fatty acid profiles were collected on day 0 control patties at each fat level. Following their conversion to methyl ester derivatives, GLC analysis of the fatty acids was performed for each sample. The identification of a peak was made from its retention time. A plot of these parameters with homologous series of saturates, monoenes, dienes, trienes, and so forth gave a series of parallel peaks, quantifying the fatty acid profile of each sample. The fatty acid profiles were not different among the fat levels (Table 1). The dominant saturated fatty acids in the control patties at each fat level were palmitic acid and stearic acid (Table 1). Among the monounsaturated fatty acids, the dominant fatty acid was oleic (18:1), then trans-vaccinic (18:1 *trans* 11), and palmitoleic (16:1) and C 20:1 (Table 1). With regard to PUFAs, (n-6) linoleic (18:2) was the primary fatty acid identified (Table 1).

The fatty acid concentrations from Table 1 were aggregated to give values for total saturated (SFA), monounsaturated (MUFA), and polyunsaturated (PUFA) fatty acids. The SFA content of total lipids was 47.05%. Fat contents of the monounsaturated fatty acids were 43.2%. The PUFA contents were 3.04%. Low contents (3.46%) of the atherogenic myristic acid (14:0) were found. Verbeke et al., (1999) found similar results in beef where atherogenic myristic acid was 3.2%. Myristic acid has a greater potential for inducing high cholesterol levels than palmitic acid (Shand et al., 1994). Our study did not identify any n-3 PUFA. However, Higgs, (2000) found total n-3 PUFA contents for beef of 1.03%. These results indicated low levels of susceptible PUFA concentrations in our samples. The oxidative stability of meat is dependent on degree of unsaturation of the lipid fraction. Oxygen attacks a double bond in the fatty acids to form peroxide linkages. Therefore, lipids containing a high content of unsaturated fatty acids have decreased oxidative stability (Buettner, 1993). With low levels of PUFA concentrations, levels of lipid oxidation were lower and sensory effects were less pronounced.

TBARS Values

TBARS values (mg malonaldehyde/kg) were measured to evaluate the effects of treatment addition, fat level, and storage time on lipid oxidation in ground beef patties (Table 2). Replication interactions occurred between treatment, fat level, and storage

Table 1- Percentage of fatty acids in raw ground beef containing different fat levels.

Fatty Acid		Fat Level 10%	20%	30%	Average
Myristic	(14:0)	3.83	3.54	3.42	3.46
Palmitic	(16:0)	27.16	25.28	23.96	25.45
Palmitoleic	(16:1)	2.54	2.61	2.29	2.48
Stearic	(18:0)	19.08	17.48	17.87	18.14
Trans-Vaccinic	(18:1)	4.84	7.30	8.48	6.87
Vaccinic	(18:1)	1.11	1.19	1.19	1.16
Oleic	(18:1)	32.95	32.92	32.07	32.65
Linoleic	(18:2)	2.88	2.98	3.27	3.04

day for TBARS values (Fig. 1, Fig. 2(a), Fig. 3(a), respectively). With beef trimmings containing either 50% or 90% lean, purchased from two commercial beef processors on three different processing days, variation among replications was expected.

The replication by treatment interaction for TBARS values showed that TBARS were higher in all patty treatments in replication 2 (Fig. 1). The control patties from replication 2 had the highest TBARS recorded (1.24 mg malonaldehyde/kg). This value was higher than the TBARS recorded in replication 1 (0.29 mg malonaldehyde/kg) and in replication 3 (0.24 mg malonaldehyde/kg) for the control patties. A similar replication by fat level and storage day interaction for TBARS values occurred, showing that TBARS were higher in replication 2 (Fig. 2(a), Fig. 3(a)). Replication is an uncontrollable factor that allows for raw material variation in our study. Without replication we could not apply our findings to the random variations that systematically occur in the commercial meat industry.

Treatment, fat level and their two way interaction affected ground beef patty TBARS values (Table 2, Fig. 4). Control patties at each fat level had higher TBARS than for the treated patties; TBARS were the highest in the patties containing 10% fat (Fig. 4). As lean meat contains a high proportion of muscle fibers and the phospholipids component in muscle fiber membranes have greater susceptibility to oxidation, these results were expected. Factors such as processing and polyunsaturated fatty acid (PUFA) content are major issues in susceptibility to lipid oxidation. Researchers have found that grinding of beef is a contributor to lipid oxidation and that grinding decreased meat quality (Kanner, 1994). Physical grinding also increases the exposure of the

Table 2- Least squares means for main effects pH, Minolta color space values and trained descriptive sensory color attributes.

Effect	TBARS	pH	Minolta color space values L*	a*	b*	Lean color[a]	Discol-oration,%[b]	Color of Discol-oration[a]
Treatment[c]	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.02001*	*0.0001*
Control	0.59[e]	6.33[de]	47.62[e]	18.92[g]	10.16[f]	2.9[f]	1.3[f]	0.70[g]
Rosemary	0.32[d]	6.33[de]	48.85[f]	19.39[g]	10.66[g]	3.3[g]	1.1[d]	0.22[d]
BHA/BHT	0.31[d]	6.30[d]	49.36[f]	19.59[g]	10.65[g]	3.3[g]	1.1[de]	0.27[de]
0.25% sorghum	0.33[d]	6.35[e]	47.79[e]	17.85[c]	10.01[f]	2.9[f]	1.3[ef]	0.40[ef]
0.50% sorghum	0.29[d]	6.36[e]	47.35[de]	16.39[e]	9.58[e]	2.5[e]	1.4[f]	0.52[fg]
1.0% sorghum	0.30[d]	6.41[f]	46.51[d]	15.32[d]	8.87[d]	2.0[d]	1.2[def]	0.44[ef]
Fat Level, %[c]	*0.0117*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.07*	*0.002*
10	0.41[e]	6.29[d]	44.88[d]	17.00[d]	8.73[d]	2.2[d]	1.1[d]	0.30[d]
20	0.31[d]	6.38[e]	47.95[e]	17.86[e]	10.2001[e]	2.8[e]	1.3[e]	0.44[e]
30	0.36[de]	6.37[e]	50.91[f]	18.87[f]	11.19[f]	3.6[f]	1.2[de]	0.54[e]
Storage Day[c]	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*
0	0.28[d]	6.24[d]	49.62[f]	21.56[g]	11.16[g]	3.5[g]	1.0[d]	0.08[d]
1	0.35[de]	6.47[f]	47.94[e]	18.74[f]	10.16[f]	3.0[f]	1.0[d]	0.09[d]
3	0.35[e]	6.26[d]	46.87[d]	17.24[e]	9.52[e]	2.6[e]	1.2[e]	0.49[e]
5	0.46[f]	6.41[e]	47.23[de]	14.10[d]	9.14[d]	2.4[d]	1.7[f]	1.04[f]
Root MSE	*0.196*	*0.088*	*2.100*	*1.637*	*0.758*	*0.38*	*0.35*	*0.40*

[a]1=very dark red; 8=light, grayish red.
[b]1=none or 0%; 7=total discoloration or 100%.
[c]P-value from analysis of variance tables.
[def] Mean values within a column and a main effect followed by the same letter are not significantly different ($P > 0.05$).

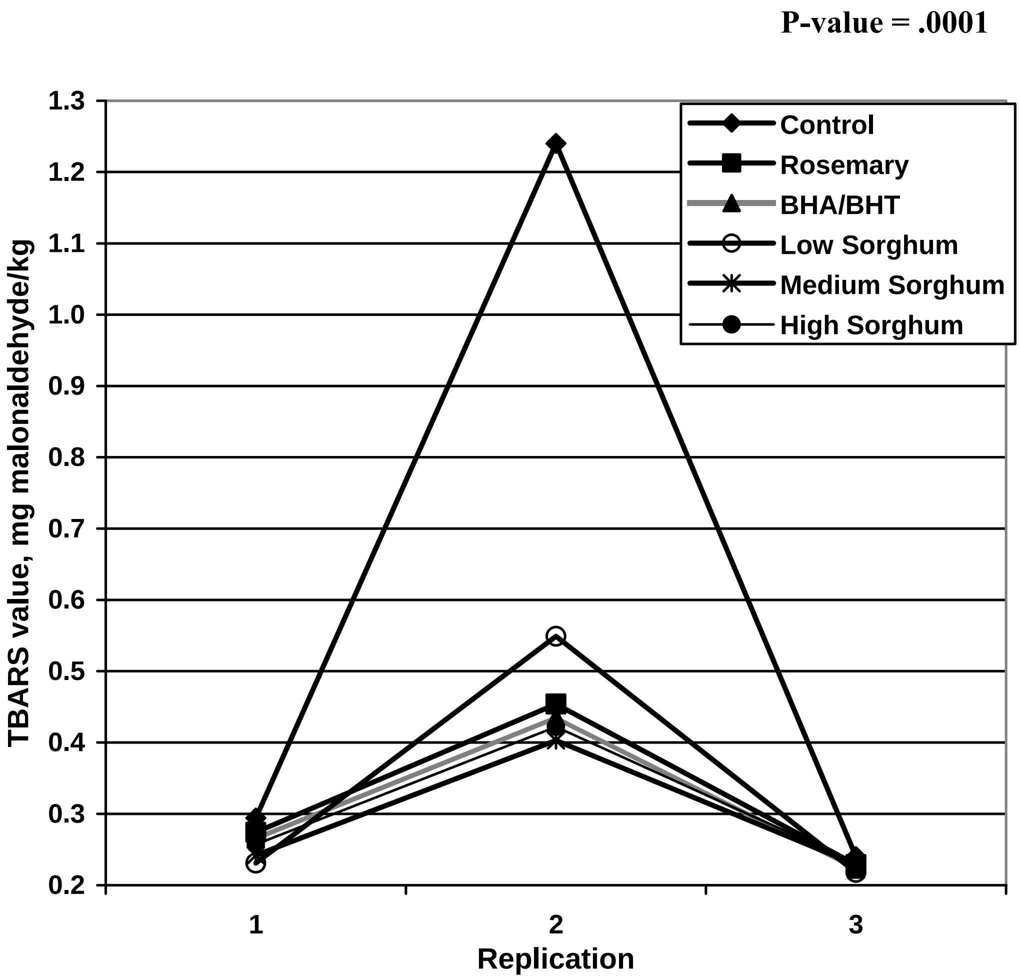
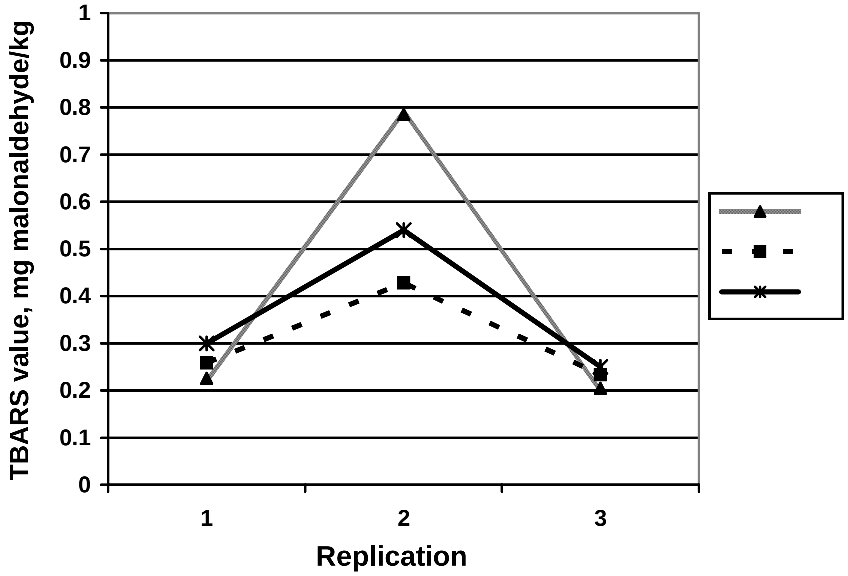


Fig. 1- Least squares means for replication by treatment interaction for TBARS values (mg malonaldehyde/kg).

(a)
P-value = .0001



(b)
P-value = .0001

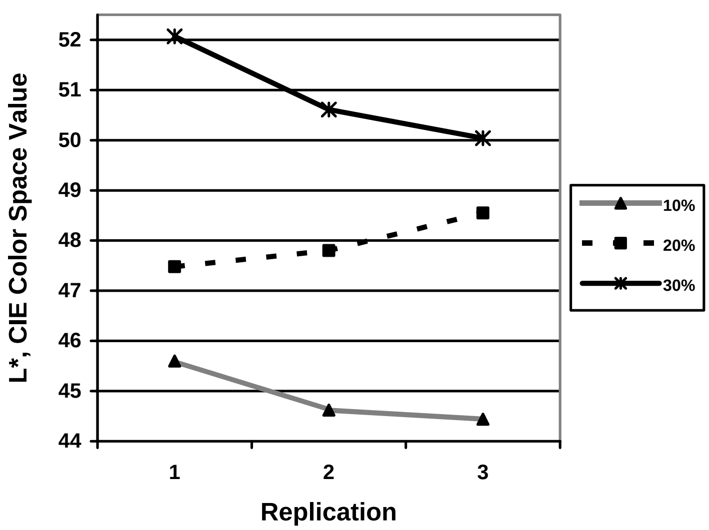
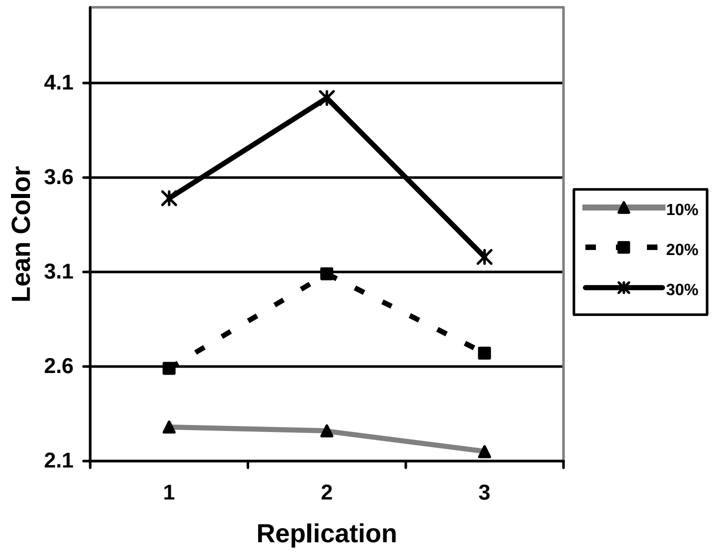


Fig. 2 - Least squares means for replication by fat level interaction for (a) TBARS values (mg malonaldehyde/kg), (b) L* color space values, (c) b* color space values, and (d) lean color values.

(c)
P-value = .03



(d)
P-value = .001

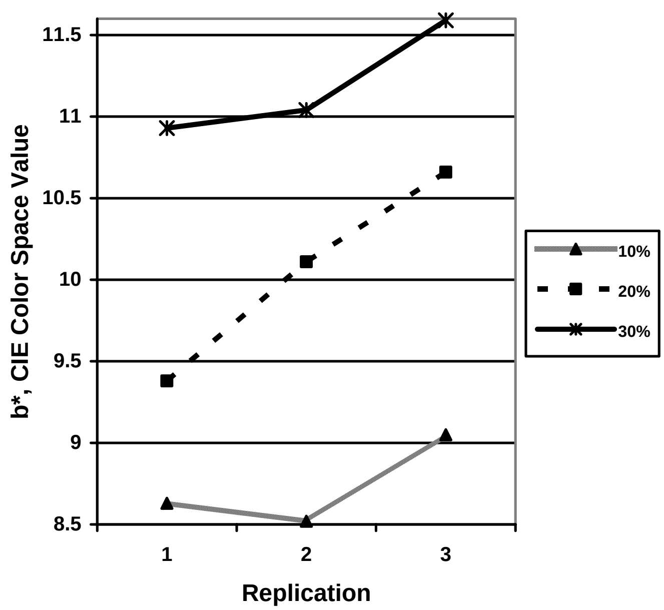
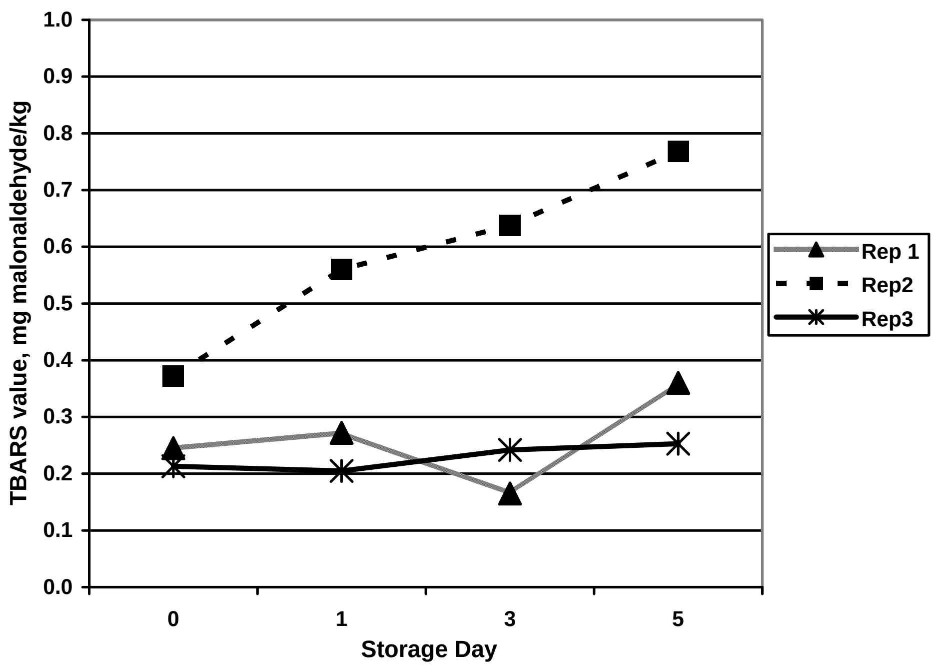


Fig. 2 – Continued.

(a)
P-value = .0009



(b)
P-value = .00001

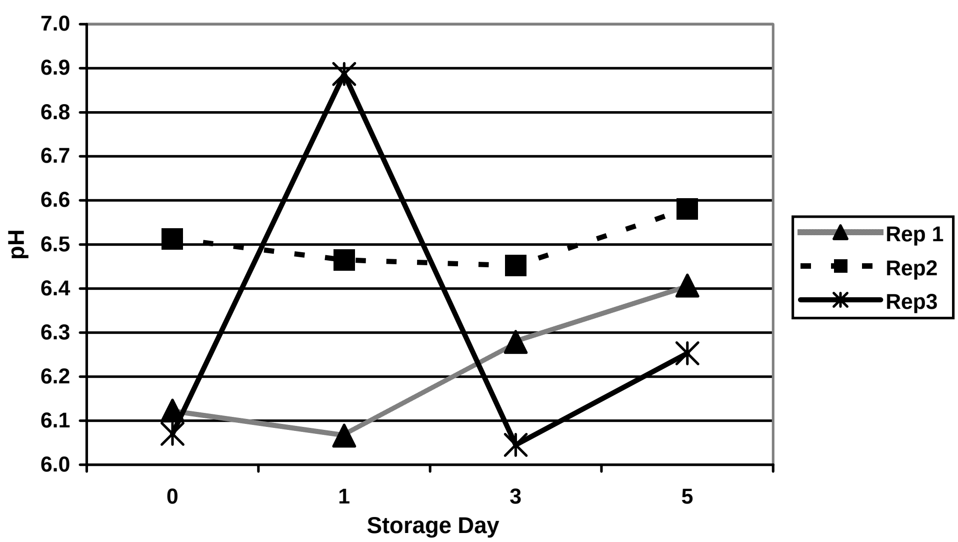


Fig. 3- Least squares means for replication by storage day interaction for (a) TBARS values (mg malonaldehyde/kg) and (b) pH values.

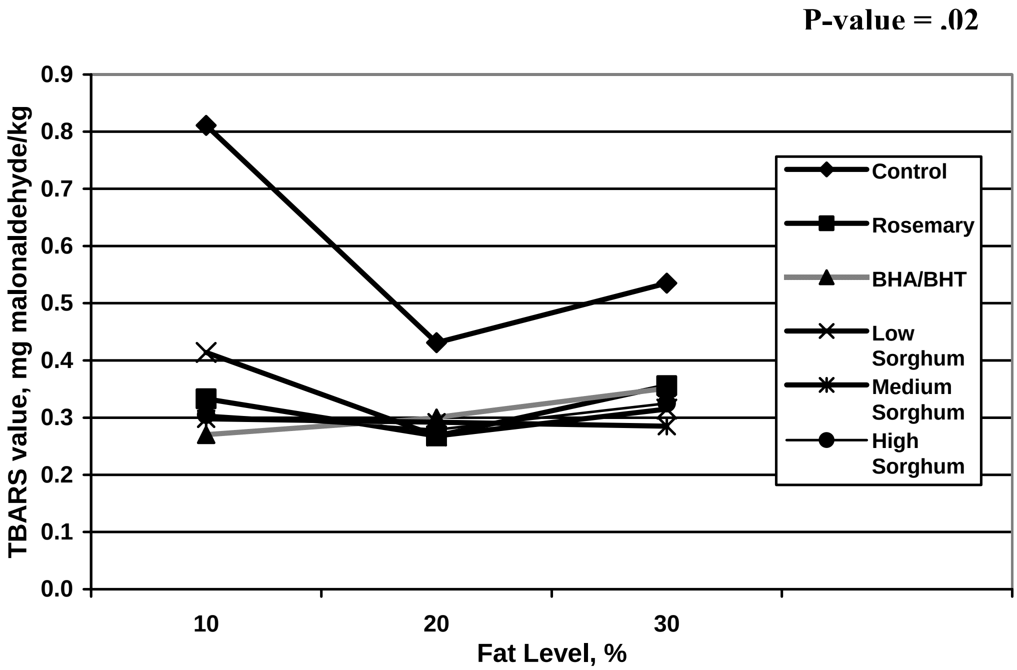


Fig. 4- Least squares means for treatment by fat level interaction for TBARS values (mg malonaldehyde/kg).

muscle surface to oxygen. This increased exposure can initiate the propagation of free radicals resulting in off-flavor development. The physical lysing of the membranes, as a result of grinding, also increases the exposure of the phospholipid bi-layer of the cell membranes to oxygen, increasing lipid oxidation. The phospholipids within a cell have been shown to be more susceptible to lipid oxidation than triacylglcerols (Kanner, 1994).

Treatment, storage day and their two way interaction also affected ground beef patty TBARS values (Table 2, Fig. 5). Control patties over time had increased TBARS values, indicating oxidation was occurring in the ground beef patties during storage (Fig 5). However, TBARS values were not greater than 1 mg malonaldehyde/kg after five days of storage; demonstrating oxidation was occurring in the patties, but not at a rapid rate. A TBARS value of 1 is considered notably oxidized in fresh meat. These low values can be attributed to the freshness of the raw material which was processed 2 days post fabrication and held at 4°C in an anaerobic environment. Also, as the FAME analysis reported low levels of susceptible PUFA concentrations in the samples, low TBARS values would be expected. Jenschke et al. (2004) showed a more pronounced effect due to treatment and storage in ground beef patties stored for up to fourteen days in an 80% oxygen /20% carbon dioxide environment. The control patties from Jenschke et al. (2004) had the highest TBARS values at days 3, 6, and 9. At day 3, the TBARS values for the control patties were greater than 1 mg malonaldehyde/kg. At day 9, the

P-value = .04

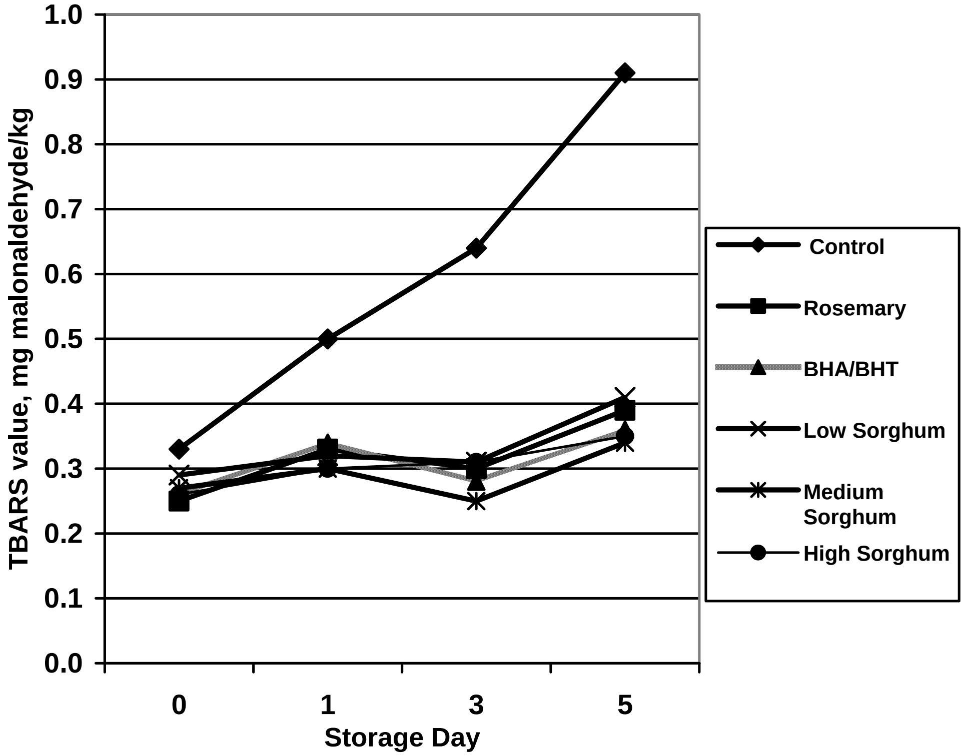


Fig. 5- Least squares means for treatment by storage day interaction for TBARS values (mg malonaldehyde/kg).

TBARS value was 4.00 mg malonaldehyde/kg, indicating extreme oxidation had occurred in the control patties. In our study, the patties containing antioxidant treatments had lower TBARS values after 1, 3, and 5 days of storage when compared to the control patties. The TBARS values were slightly greater in the patties at the end of storage (day 5). The addition of sorghum bran at 0.25% in ground beef patties resulted in lower TBARS values when compared to the controls. Increased addition of sorghum bran to 1.0% resulted in slightly lower TBARS values during storage. Even though differences were not statistically different, it is evident that sorghum bran provided a means to slow or limit lipid oxidation development.

Lipid oxidation is a naturally occurring process initiated by the presence of oxygen, degree of fatty acid saturation, and the presence of prooxidants (Kanner, 1994). Free radicals propagate the lipid oxidation reaction and control over these free radicals is essential when trying to slow lipid oxidation. Antioxidants work by terminating the cycle of free-radical destruction. The chain-breaking, free-radical scavengers are referred to as primary antioxidants. Secondary antioxidants serve as oxygen binders are frequently called synergists because they enhance the effect of the primary antioxidant by removing oxygen from the auto-oxidative process. The primary antioxidants in our study were the BHA/BHT and rosemary extract treatments. Oxygen reacts preferentially with the fat-soluble BHA/BHT compounds rather than oxidizing the lipids, thereby protecting them from spoilage. The phenolic compounds in rosemary extract are capable of interfering with lipid oxidation by rapidly donating a hydrogen atom to lipid free radicals, thus breaking the chain reaction of the oxidation process. The effectiveness of

BHA/BHT and rosemary as antioxidants has been previously reported (Djenane et al., 2001; Movileanu et al., 2004; Robbins et al., 2004). Movileanu et al. (2004) evaluated the reduction of oxidation in irradiated ground beef patties containing different antioxidant treatments stored for 28 days. Among the antioxidant treatments, samples containing BHA/BHT and rosemary extract showed the greatest antioxidant effect and had similar TBARS values at each storage day (Movileanu et al., 2004). Another study found similar TBARS results when BHA/BHT and rosemary were used as treatments in fresh refrigerated pork sausage patties (Robbins et al., 2004). Robbins et al. (2004) also found that rosemary extract also improved redness and visual color evaluations revealed panel preference for samples treated with rosemary. Our findings support the previous studies results. Each study showed that TBARS values were significantly affected by the antioxidant treatment.

Our study demonstrates that sorghum bran additions provide an antioxidant effect when used in a ground beef model system. Sorghum bran contains lipophilic tannin compounds that have a powerful ability to donate electrons to free radicals (Hagerman, 1998). Along with their free radical scavenging ability, tannins have also been found to be strong metal chelators, adding to their antioxidant potential (Bors et al., 1990; Carbonaro et al., 1996). The anthocyannins in sorghum are water soluble components that also act as free radical scavengers. Sorghum abundantly contains the 3-deoxyanthocyanidins (3-DAs) apigeninidin and luteolinidin, which are rare or absent in other plants (Awika et al., 2004). The 3-DAs are of interest because they are more stable in organic solvents as well as in acidic solutions than anthocyanidins commonly found in fruits, vegetables, and other cereals (Awika et al., 2004). The combination of the lipophilic and hydrophilic antioxidants give sorghum bran its ability to scavenge free radicals through electron-donating properties, generating a relatively stable phenoxyl radical or nonradical species (Parr et al., 2000; Santos et al., 2000; Lu et al., 2001; Pellegrini et al., 2003).

With superior phenolic antioxidant activities reported in previous studies for sorghum (Awika et al., 2003), a greater effect against lipid oxidation was expected when compared to BHA/BHT and rosemary treatments. It is probable that there was not enough oxidation occurring in our meat system. In our study, samples packaged in an anaerobic environment and stored for only five days resulted in TBARS values below 1 mg malonaldehyde/kg. Compared to our study, Jenschke et al. (2004) packaged samples in an 80% oxygen /20% carbon dioxide environment and stored them for fourteen days, creating a system with greater oxidation. After 9 days of storage, TBARS value was 4.00 mg malonaldehyde/kg, indicating extreme oxidation had occurred in the control patties (Jenschke et al., 2004). Thus, further research is needed with a more oxygen induced model system.

pH

A replication by storage day interaction occurred for pH (Fig. 3(b)). Patties from replication 2 had the highest pH values over time except after 1 day of storage. In replication 3, a pH value of 6.89 was recorded for day 1. This was a significant increase from the previous day 0 pH value of 6.07 and then following day 3 pH value of 6.05. This unexpected high pH value could be a result of a possible calibration error in our pH meter for that replication and day. Triplicates within a patty had normal variation, indicating the pH meter was functioning properly. In general, the pH values for all replications showed a similar slow increasing trend over time.

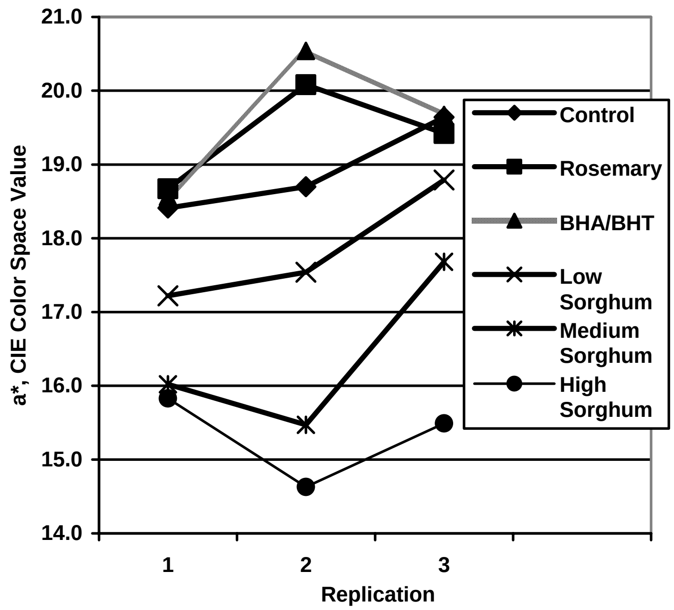
Treatment, fat level, and storage day affected pH (Table 2). The pH value was the lowest in the control, BHA/BHT, and rosemary treated patties. As sorghum bran additions increased, pH value tended to increase. Patties containing a high level of sorghum had the highest pH value (6.41). Patties with higher fat levels were higher in pH. Patties stored for 5 days had higher pH than patties stored for 0 days. The highest pH value recorded was 6.47 on storage day 1. This high pH value can be attributed to the possible replication effect for day 1 of replication 3.

Chemical changes that occur in meat stored in an aerobic environment can be attributed to the oxidative metabolism of microorganisms. The aerobic-Gram negative bacteria, *Psedomonas fragi, Ps. fluorescens* and *Ps. lundensis* were found to be the dominant species on meat stored under aerobic conditions at 4°C (Kakouri et al., 1994). *Pseudomonas fragi* is able to catabolize creatine and creatinine under aerobic conditions. The catabolisim of these substrates causes the release of ammonia, which causes an increase in pH. Similarly, we observed a gradual increase in pH over storage time in ground beef patties packaged in an aerobic atmosphere. Our findings are similar to the increasing pH trend over time observed in Jenschke et al. (2004). While microbial levels and types were not evaluated, the pH increase during storage is most likely a function of treatment addition. The solubilization of the sorghum bran compounds during storage would cause the pH to increase during storage.

Color

Replication interactions occurred between fat level, treatment, and storage day for L*, a*, and b* color space values (Fig. 2(b), Fig. 2(c), Fig. 6(a), Fig. 6(b), Fig. 7(a), Fig 7 (b)). The replication by fat level interactions for L* and b* color space values showed that the low fat patties were the darkest (low L* value) and the least yellow and the high fat patties were the lightest and the most yellow for all replications (Fig. 2(b) and Fig. 2(c)). The highest b* color space values were recorded in replication 3 for all fat levels. The replication by treatment interactions for a* and b* color space values showed that patties were more red (higher a* value) and more yellow (higher b* value) in replication 3 (Fig. 6(a), Fig. 6(b)). However, in the patties with rosemary treatments the a* and b* color space values were the highest in replication 2. The replication by treatment interactions also showed that sorghum bran additions decreased the a* and b* color space values, resulting in less red and less yellow patties in all replications. The replication by storage day interaction for L* color space values showed that patties generally became darker over time in replication 1 and replication 3 (Fig. 7(a)). However, in replication 2 the patties became darker from day 0 to day 1 then L* color space values increased and patties became lighter from day 1 to day 5. The replication by storage day interaction for a* color space values showed that patties were less red in replication 1 for day 0, 1, and 3 (Fig. 7(b)). In general, patties became less red during storage in all replications.

(a)
P-value = .0078



(b)
P-value = .0082

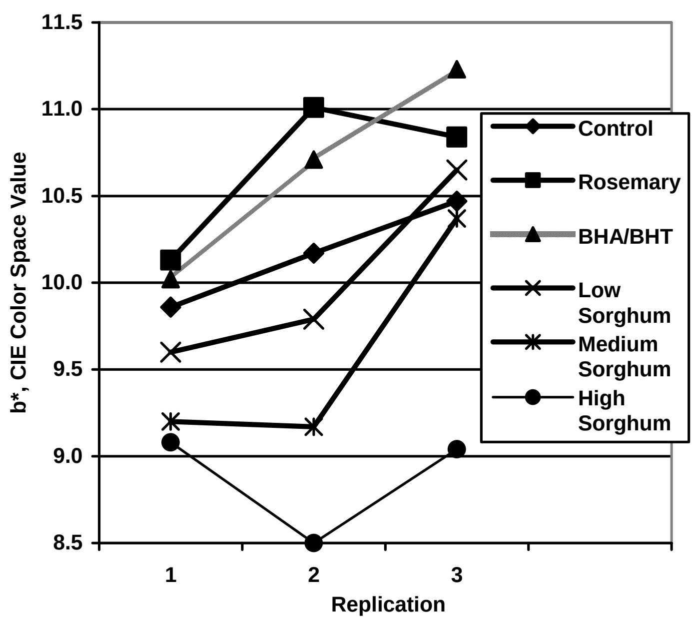
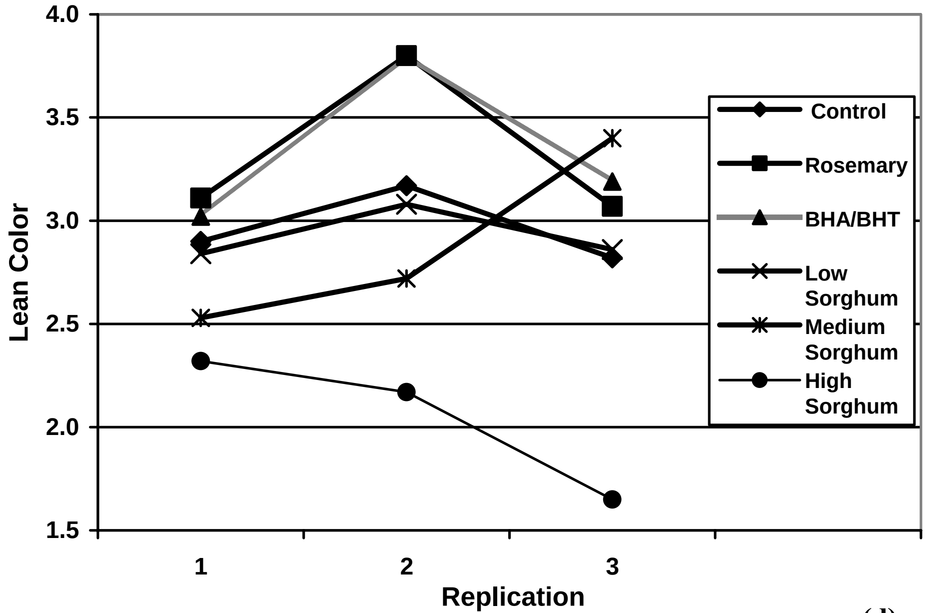


Fig. 6 - Least squares means for replication by treatment interaction for (a) a* color space values, (b) b* color space values, (c) lean color values, and (d) discoloration color values.

(c)
P-value = .0007



(d)
P-value = .02

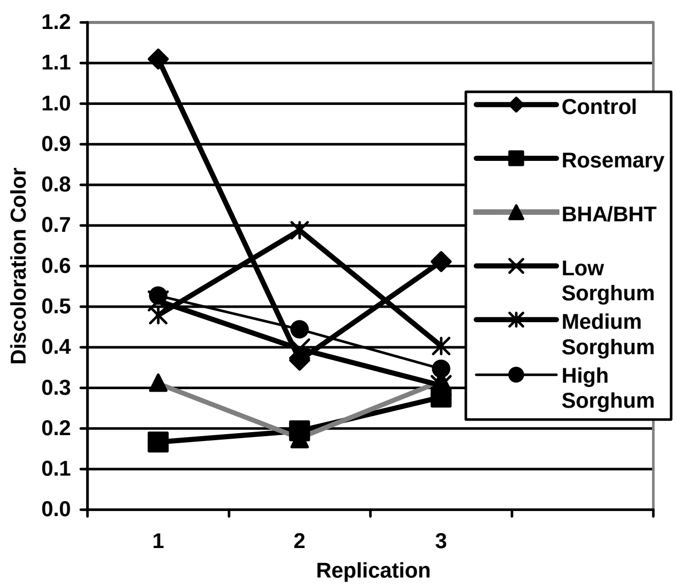
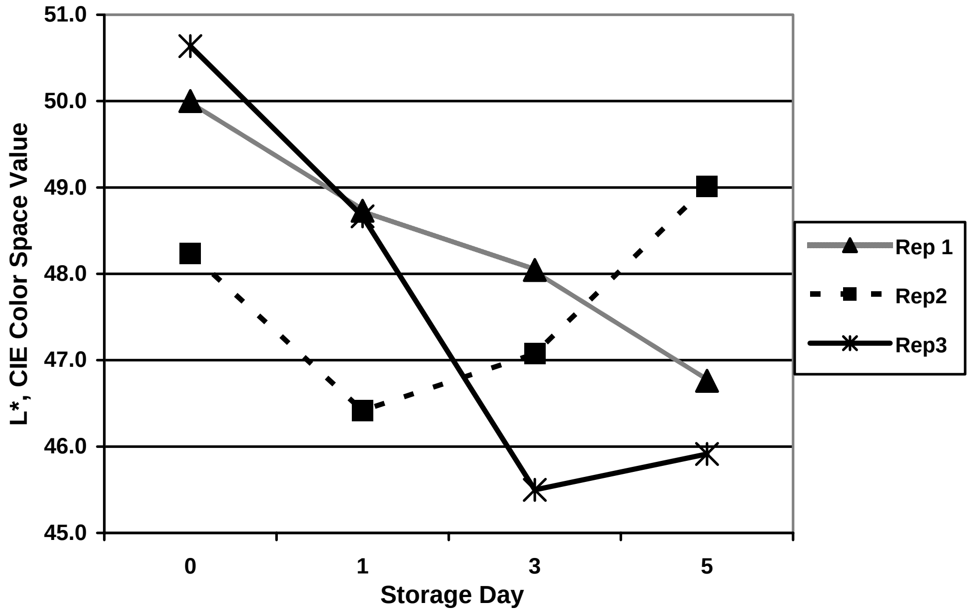


Fig. 6 – Continued.

(a)
P-value = .0001



(b)
P-value = .0001

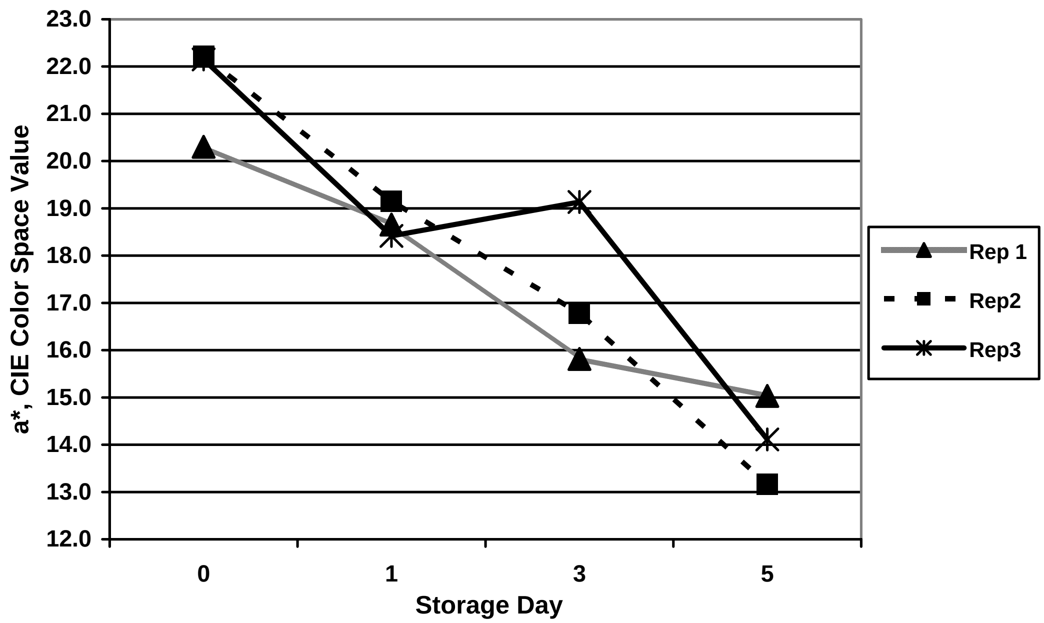
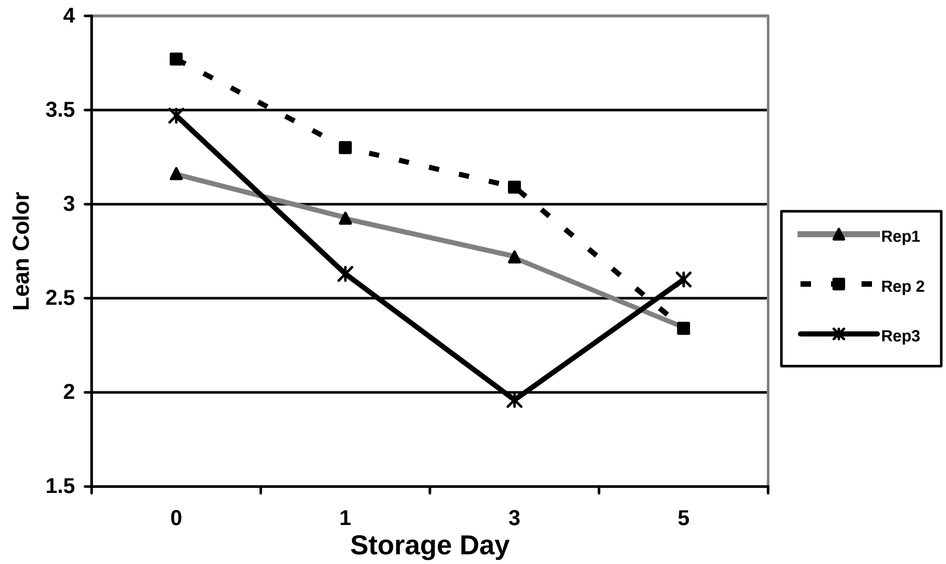


Fig. 7- Least squares means for replication by storage day interaction for (a) L* color space values, (b) a* color space values, (c) lean color, (d) amount of discoloration, and (e) discoloration color

Replication interactions also occurred between fat level, treatment, and storage day for panel color scores for lean color, amount of discoloration, and color of the discoloration (Fig. 2(d), Fig. 6(c), Fig. 6(d), Fig. 7(c), Fig. 7(e), Fig. 7(d)). The replication by fat level interactions show that the panel found the patties to have the lightest lean color, at all fat levels, in replication 2 (Fig. 2(d)). The replication by treatment interaction for lean color showed that panelists generally found the lean color for all the treated patties to be the darkest in replication 3 and the lightest in replication 2 (Fig. 6(c)). The replication by treatment interaction for the discoloration color showed that panelists found the rosemary treated patties to have the darkest discoloration color in replication 1 and the controls to have the lightest discoloration color. However, in replication 2, the BHA/BHT treated patties had the darkest discoloration color and the medium level sorghum treated patties had the lightest discoloration color (Fig. 6(d)). The differences in theses values can be attributed to the variation of raw material between replications. The replication by storage day interaction showed that the panel found the lean color of the patties was darker over time in replication 3. The panel also found that the lean color and the color of the discoloration in replication 2 did not become as dark as it did in replication 3 (Fig. 7(c), Fig, 7(e)). The replication by storage day interaction for the amount of discoloration showed that the panelists found the amount of discoloration increased from day 0 to day 3 for replication 1 and replication 2, but the amount of discoloration decreased in replication 3 (Fig. 7(d)). Again, these differences in values and scores can be attributed to the variation of raw material between replications.

(c)
P-value = .0001



(d)
P-value = .0001

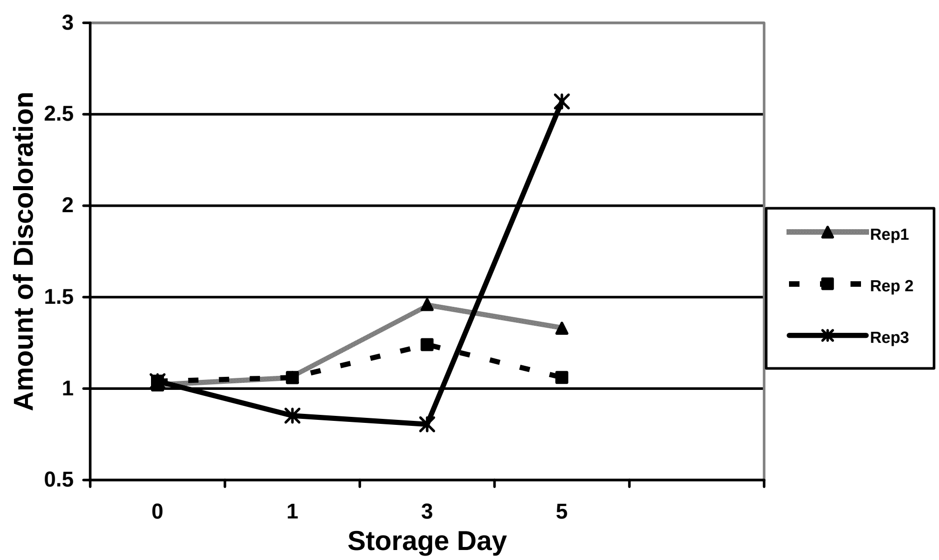


Fig. 7 - Continued.

(e)
P-value = .0001

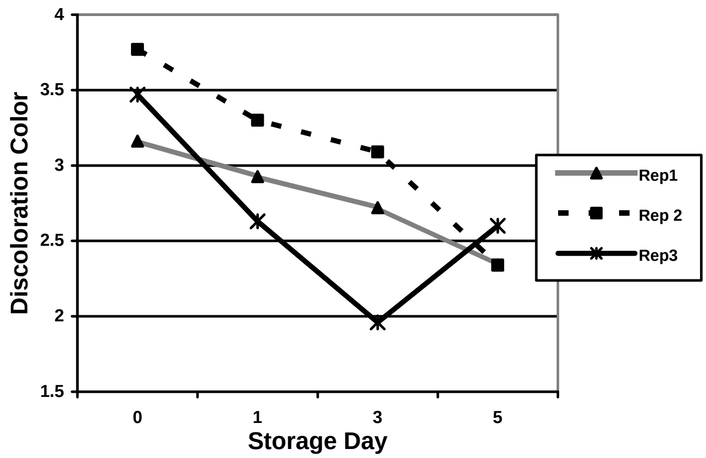


Fig. 7 - Continued.

Treatment affected L*, a*, and b* color space values and sensory color measurements (Table 2). The addition of rosemary and BHA/BHT resulted in lighter and slightly more yellow patties. The rosemary and BHA/BHT treated patties had higher sensory lean color scores, slightly less discoloration, and of the lean that was discolored, the discoloration was lighter. The patties treated with increasing levels of sorghum impacted ground beef color (Table 2). The high level sorghum bran addition resulted in darker patties that were less red and yellow. Panelists found that patties containing sorghum bran had similar amounts of discoloration as control patties, but the color of the discoloration tended to be lighter that the control patties. There was a significant treatment by fat level interaction for the b* color space values (Fig. 8). As fat level increased, ground beef patties increased in yellow color. In general, as fat level increased, ground beef patties were lighter, redder, and had more yellow (Table 2). A storage day effect was observed for objective color and sensory color scores. Increased storage days resulted in ground beef patties that were darker, less red and yellow, had higher amounts of discoloration, and the discoloration color became darker. Jenschke et al. (2004) found that the addition of sorghum bran at the 2.0% level resulted in lower raw color scores, greater amounts of discoloration, and darker discoloration color. At the lower levels used in this study (high level = 1.0% meat weight), the sorghum bran treated patties were slightly darker, but the differences were less pronounced than in Jenschke et al. (2004).

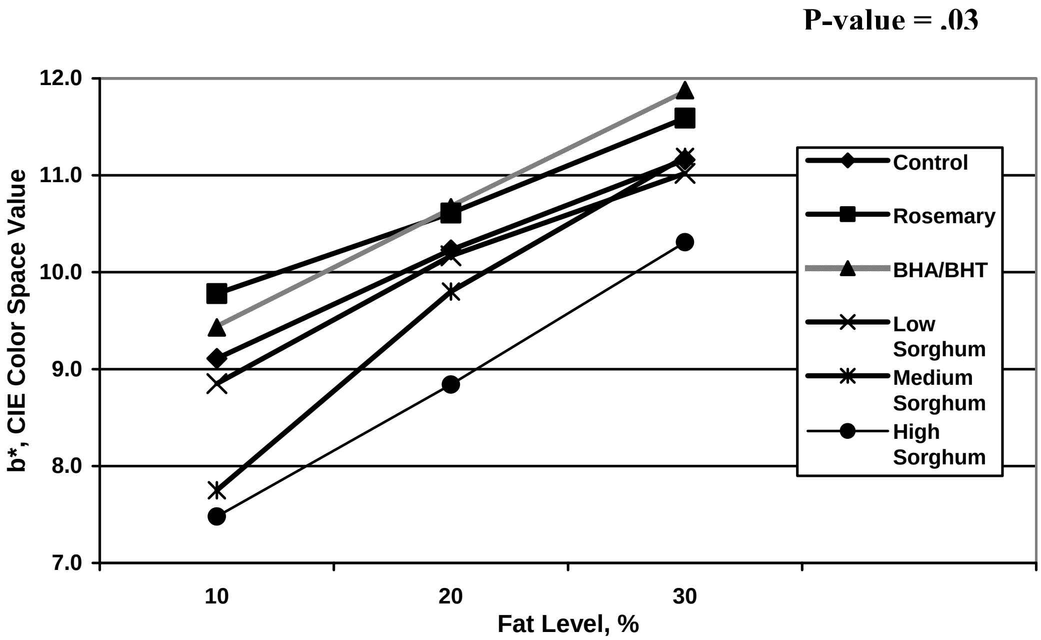


Fig. 8 - Least squares means for treatment by fat level interaction for b* color values.

Sensory Analysis

A trained sensory panel was used to evaluate the effect of treatment, fat level, and storage day on the flavor and texture characteristics of the ground beef patties. The flavor changes that occur in meat are a result of the catalytic oxidation of lipids in bio-membranes. When lipid oxidation occurs, the rapid development of rancid flavors and odors in the fat occurs. Hydroperoxides are generated in the termination phase of lipid oxidation and then decompose to create a wide range of carbonyl compounds, hydrocarbons, funans, and other material that contribute to flavor deterioration (Kanner, 1994).

Warmed over flavor (WOF), first recognized by Tims and Watts (1958), is the term given to describe the off-flavor and odor development in cooked meat products during storage. Warmed over flavor in meat was described to have a “cardboard-like”, “stale”, and “rancid” flavor (Vega and Brewer, 1994). Johnsen and Civille (1986) developed a standard lexicon to evaluate meat with potential WOF characteristics. In their study, beef patties were cooked, stored for five days, and reheated to represent WOF patties. The WOF patties, along with beef patties that were recently cooked (control), were evaluated by a trained sensory panel. The panel defined specific aromatics such as: cooked beef lean, cooked beef fat, browned, serumy/bloody, musty, grainy, rancid, and cardboard. In their study, the panel found the reheated, WOF patties to have lower scores for cooked beef, cooked beef fat, browned, serumy/bloody, and grainy aromatics. The reheated samples had higher scores for cardboard and rancid aromatics.

The flavor characteristics of meat are influenced by genetics and environmental factors. Many WOF flavor aromatics develop during cooking through the degradation and reactions of meat lipids and water soluble compounds (Moody 1983; Shahidi and Rubin, 1986). Most of the flavor-carrying molecules are hydrophobic. Since water is the most prevalent component of meat, the flavor-carrying molecules dissolve in the meat lipids. The meat lipids also act as a solvent for the volatile compounds that accumulate during cooking of meat (Moody, 1983).

Another major contributor to the development of WOF characteristics in meat is myoglobin and ferrous iron content (Miller, 2001). Both iron and myoglobin are prooxidants and have been shown to have a detrimental effect on flavor. Igene et al. (1979) clarified the role of myoglobin and ferrous iron in the development of WOF by demonstrating that cooking releases the iron from the myoglobin and thereby indirectly accelerates the development of oxidation. Cooking cleaves the heme pigments to release free non-heme iron, which then serves as the direct catalyst for oxidation. Miller (2001) reported that elevated myoglobin levels within a meat cut can result in higher grainy and livery flavor aromatic scores.

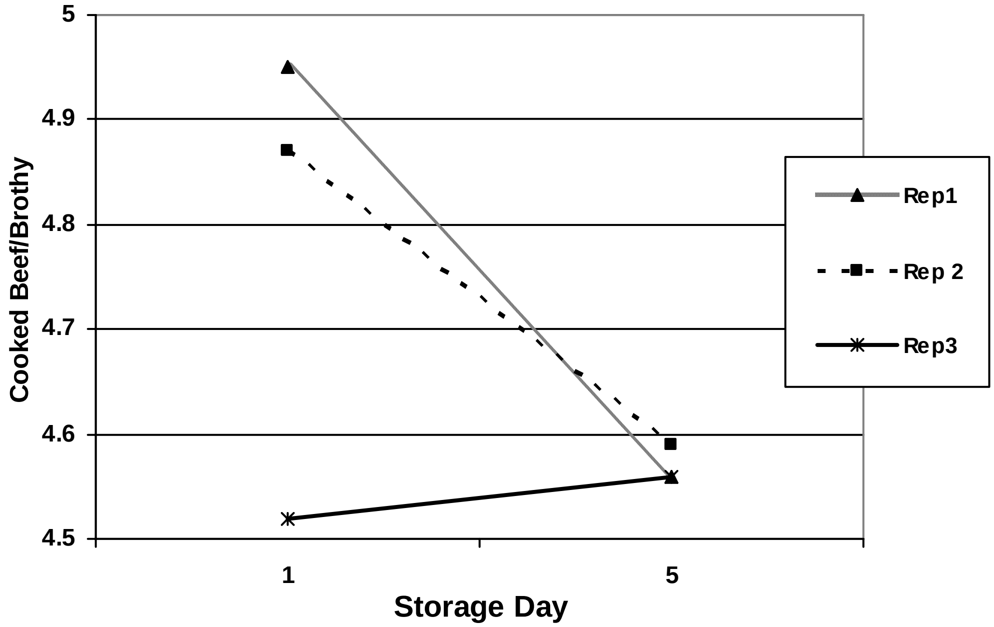
In our study, replication by storage day interactions occurred for numerous flavor and texture sensory attributes. The panel found the intensity of the flavor attributes cooked beef/brothy and serumy to decrease over storage (5 days) in replications 1 and 2 (Fig. 9(a) (b)). The cooked beef flavor is generated by the Maillard reaction during cooking. When meat is cooked, proteins on the surface are denatured and recombine with the sugars present. The combination creates a strong "meaty" flavor and also changes the color of the meat. In replication 2 there was a significant increase during storage of the grainy flavor attribute (Fig. 9 (c)). Grainy is the flavor aromatic associated with the flavor of cow meat. In replication 1 there was a significant increase of the browned and sorghum flavor attributes, but a slight decrease in these attributes in replication 2 (Fig. 9 (d) (e)). The metallic feeling factor is often described as the mouthfeel associated with oxidized metals (Chambers et al., 1992). Metallic mouthfeel is often an indication of lipid oxidation. Civille and Lyon (1996) define the astringent feeling factor as a mouthfeel described as puckering/dry and associated with tannins. The metallic and astringent feeling factors showed similar trends in all three replications (Fig. 10 (a) (b)). In replication 3, there was a significant increase in these feeling factors, but there was little change detected in replication 1 or replication 2. Basic tastes and aftertastes represent flavors that are sensed on the tongue and in the mouth during and after sample testing. For the basic tastes salty, bitter, and sour, the panel detected a decrease in these attributes during storage in replication 2, but an increase in replication 1 (Fig. 11 (a) (b) (c)). In replication 3, the panel found a considerable decrease over time in the salty basic taste when compared to replications 1 and 2. Replication 3 also showed a significant increase in the bitter basic taste when compared to replications 1 and 2. For sensory aftertastes serumy, browned, and sorghum, replication 1 showed the most significant changes in these attributes over time (Fig. 12 (a) (b) (c)). In replication 1, the panel found the serumy aftertaste to decrease during storage and the browned and sorghum aftertastes to increase during storage. The panel found the metallic aftertaste to increase during storage in replications 1 and 3, but to decrease in replication 2 (Fig. 12

(d)). During storage, the sweet, bitter, and sour aftertastes followed similar increasing trends in replications 1 and 2, but were significantly different in replication 3 (Fig. 12 (e) (f) (g)). The panel found these basic aftertastes to increase in the first two replications. In replication 3, the panel found a decrease in the sweet aftertaste, no change in the bitter aftertaste, and a more pronounced increase in the sour aftertaste when compared to the other replications. In all three replications, the sensory texture springy was found to increase during storage (Fig. 13). Springiness is the ability of a sample to return to its original shape after being compressed. The highest levels of springiness were detected in replication 3.

Differing trends for sensory scores were generally found in replication 3. These differences can be credited to raw material differences. Replication differences were reported for TBARS, pH, and color scores indicating that raw material differences may have existed.

Flavor aromatic attributes, basic tastes, feeling factors, textures, and aftertastes for this study are reported in Tables 3, 4, and 5, respectively. Treatment effects on sensory scores showed that the addition of rosemary and BHA/BHT to ground beef patties were similar in sensory flavor and basic taste attributes to the control patties, except patties containing rosemary had less cooked beef/brothy flavor aromatics than control patties (Table 3). However, rosemary, BHA/BHT, and sorghum treated patties were harder and more springy than the control patties. The addition of sorghum bran

(a)
P-value = .0116



(b)
P-value =.0004

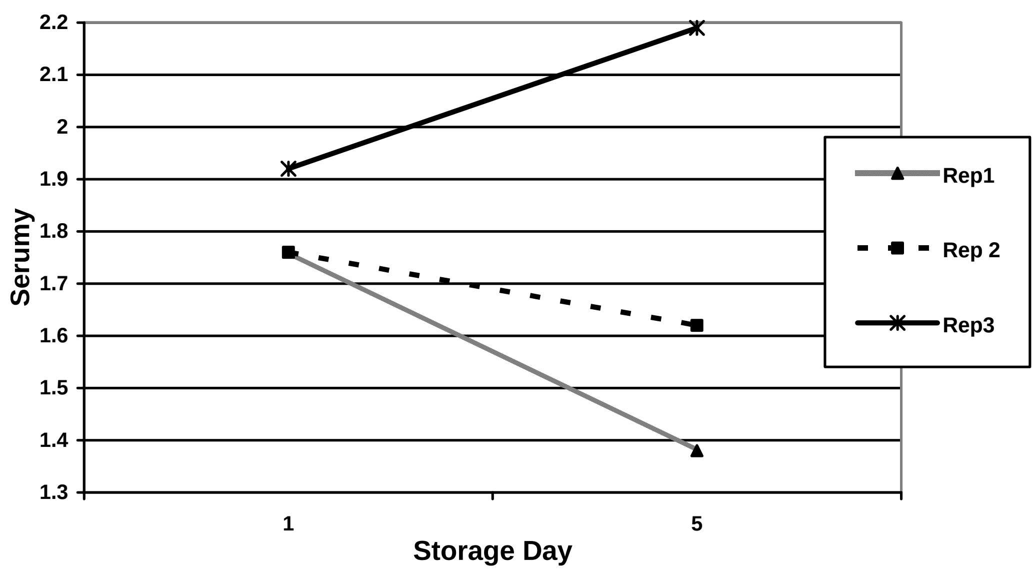
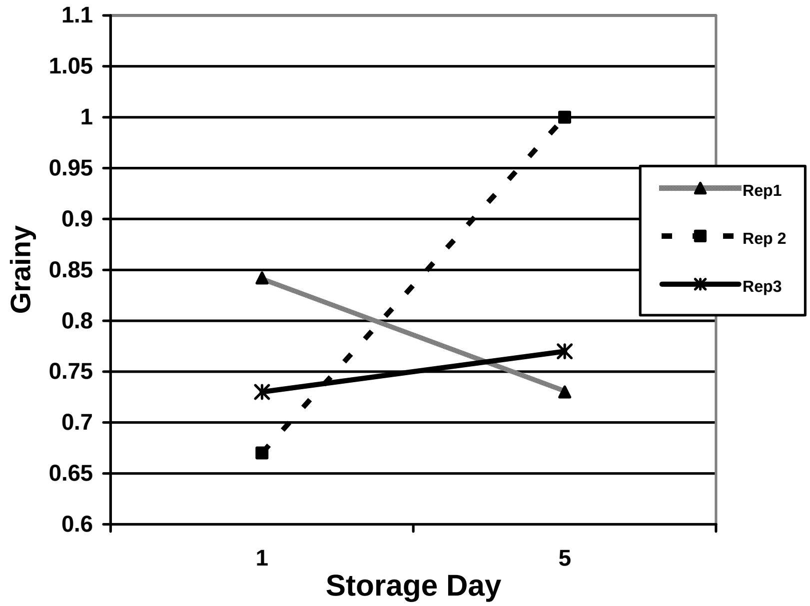


Fig. 9 - Least squares means for replication by storage day interaction for the sensory attribute (a) cooked beef/brothy, (b) serumy, (c) grainy, (d) browned, and (e) sorghum.

(c)
P-value = .0155



(d)
P-value = .006

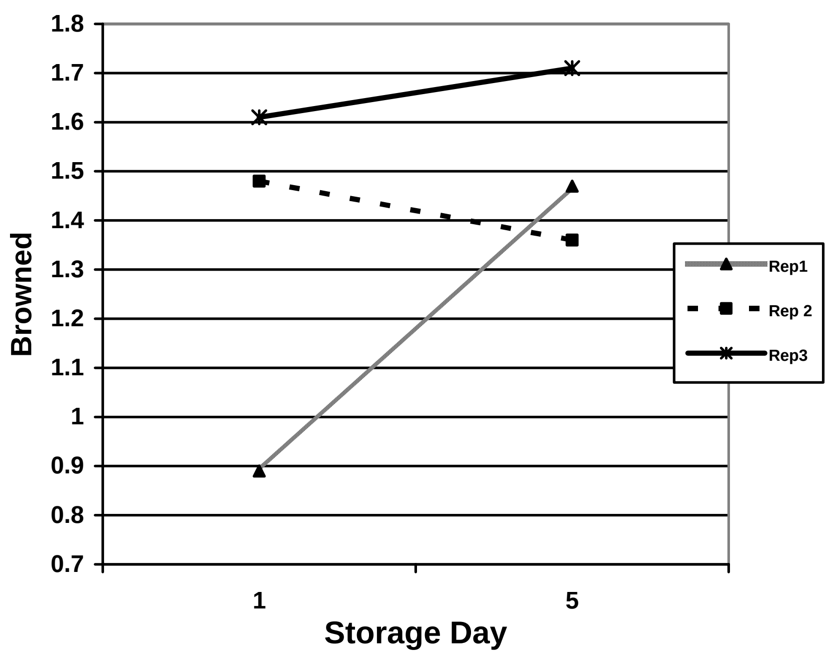


Fig. 9 – Continued.

(e)
P-value = .006

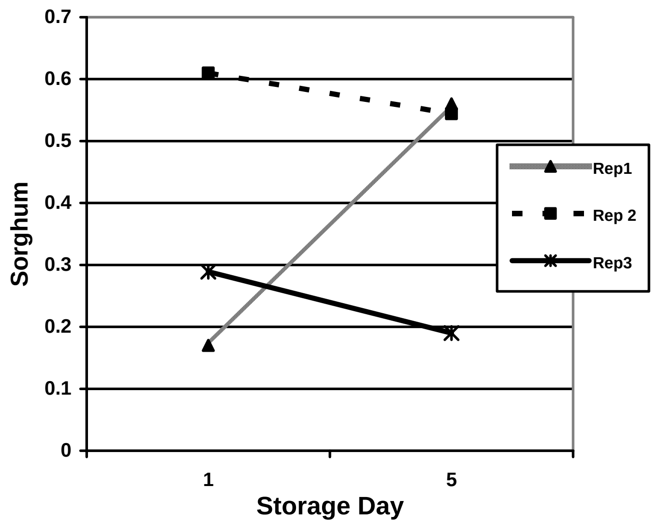
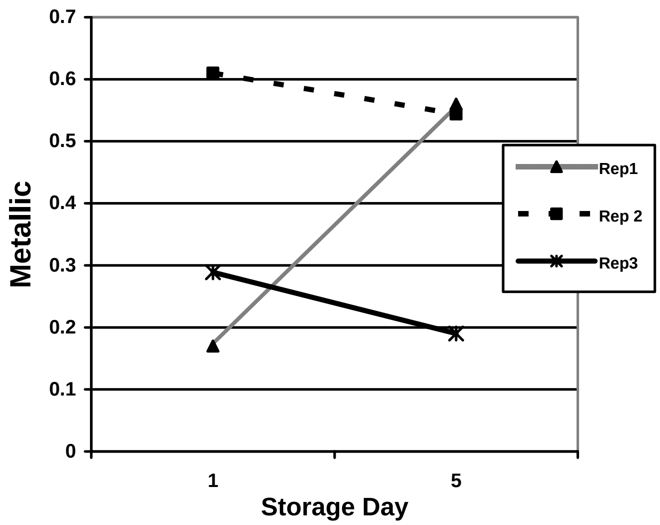


Fig. 9 – Continued.

(a)
P-value= .0001



(b)
P-value = .03

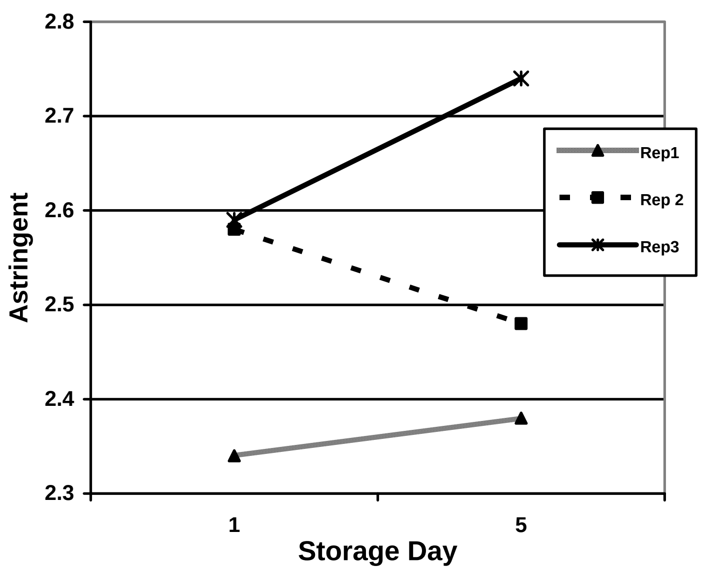
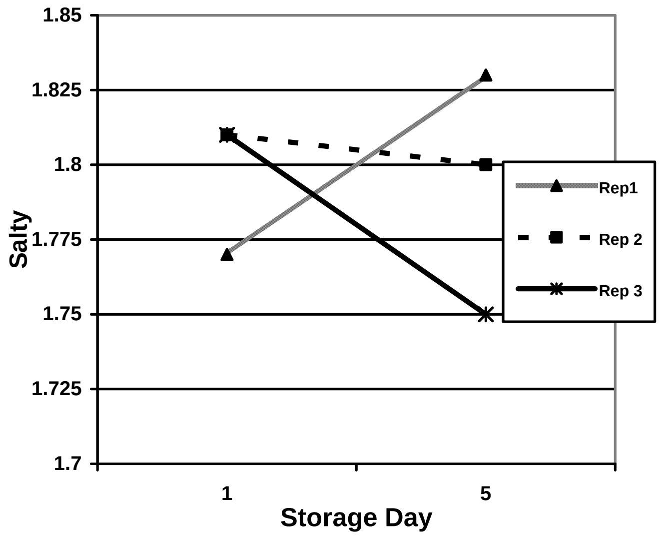


Fig. 10 - Least squares means for replication by storage day interaction for the sensory feeling factor (a) metallic and (b) astringent.

(a)
P-value = .0001



(b)
P-value = .02

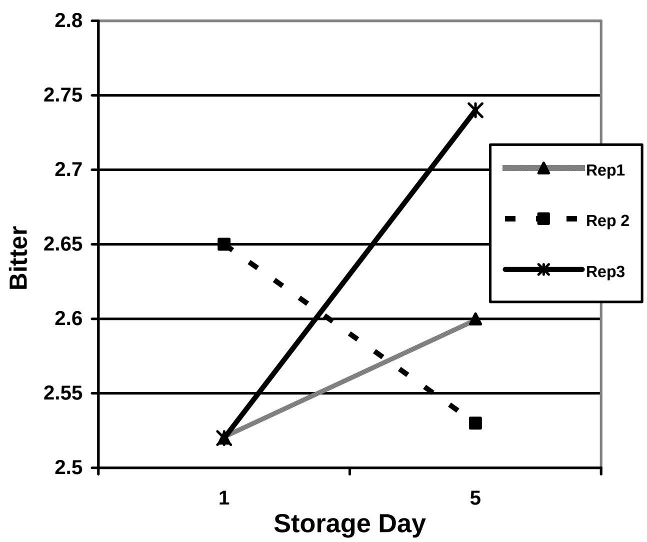


Fig. 11 - Least squares means for replication by storage day interaction for the sensory attribute (a) salty, (b) bitter, and (c) sour.

(c)
P-value = .01

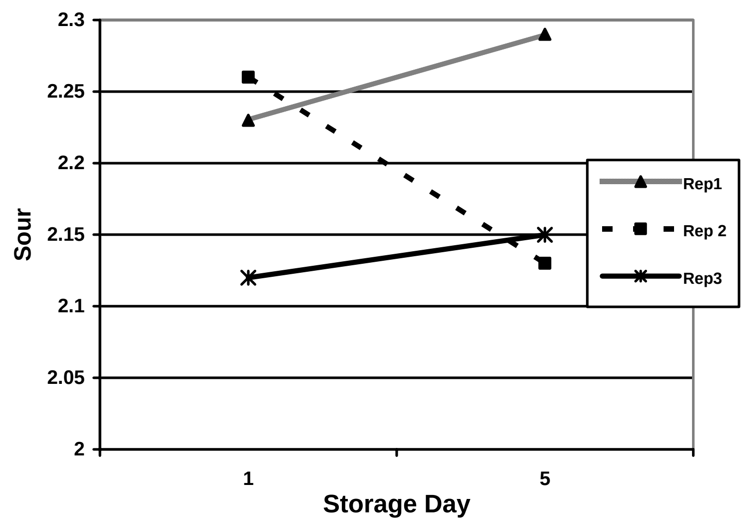
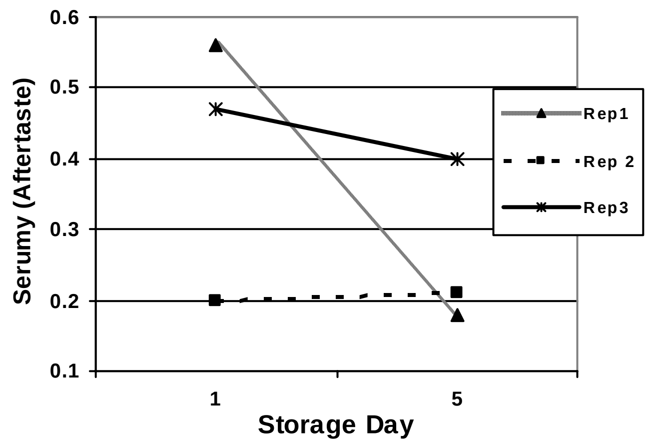


Fig. 11 – Continued.

(a)
P-value = .0001



(b)
P-value = .04

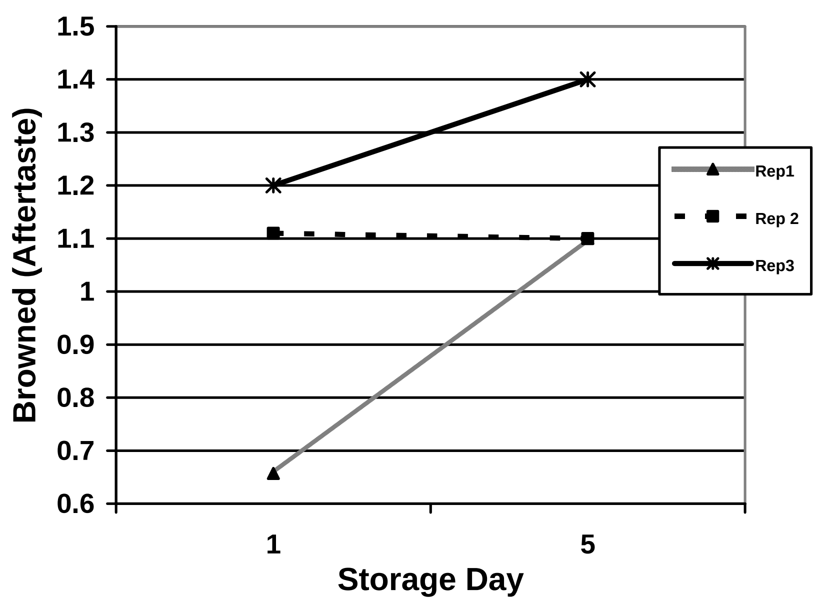
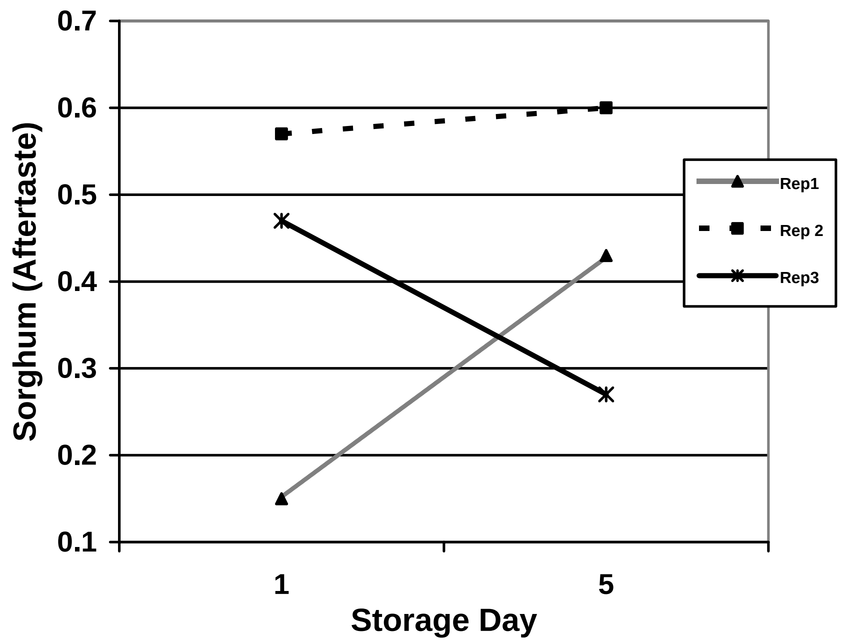


Fig. 12 - Least squares means for replication by storage day interaction for the sensory aftertaste (a) serumy, (b) browned, (c) sorghum, (d) metallic, (e) sweet, (f) bitter, and (g) sour.

(c)
P-value = .003



(d)
P-value = .004

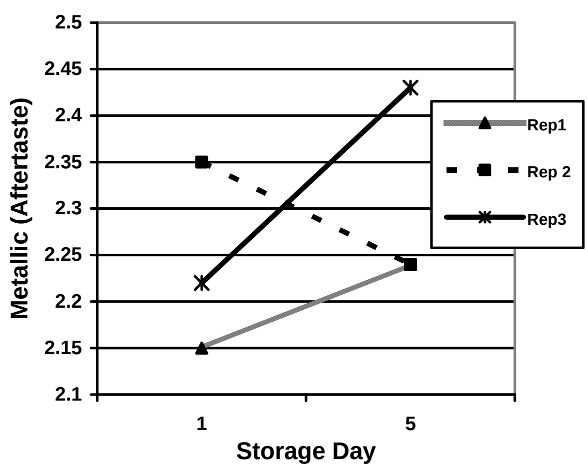
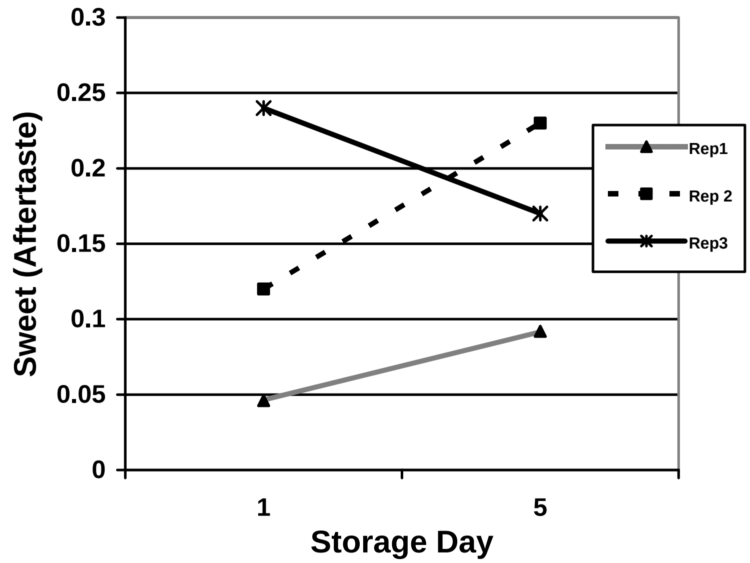


Fig. 12 - Continued.

(e)
P-value = .01



(f)
P-value = .0001

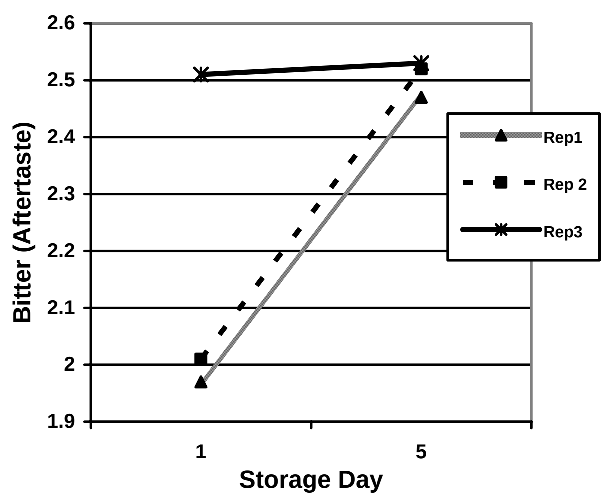


Fig. 12 - Continued.

(g)
P-value = .006

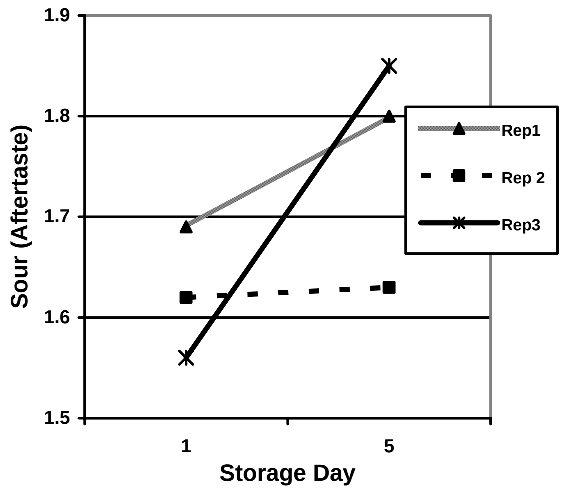


Fig. 12 - Continued.

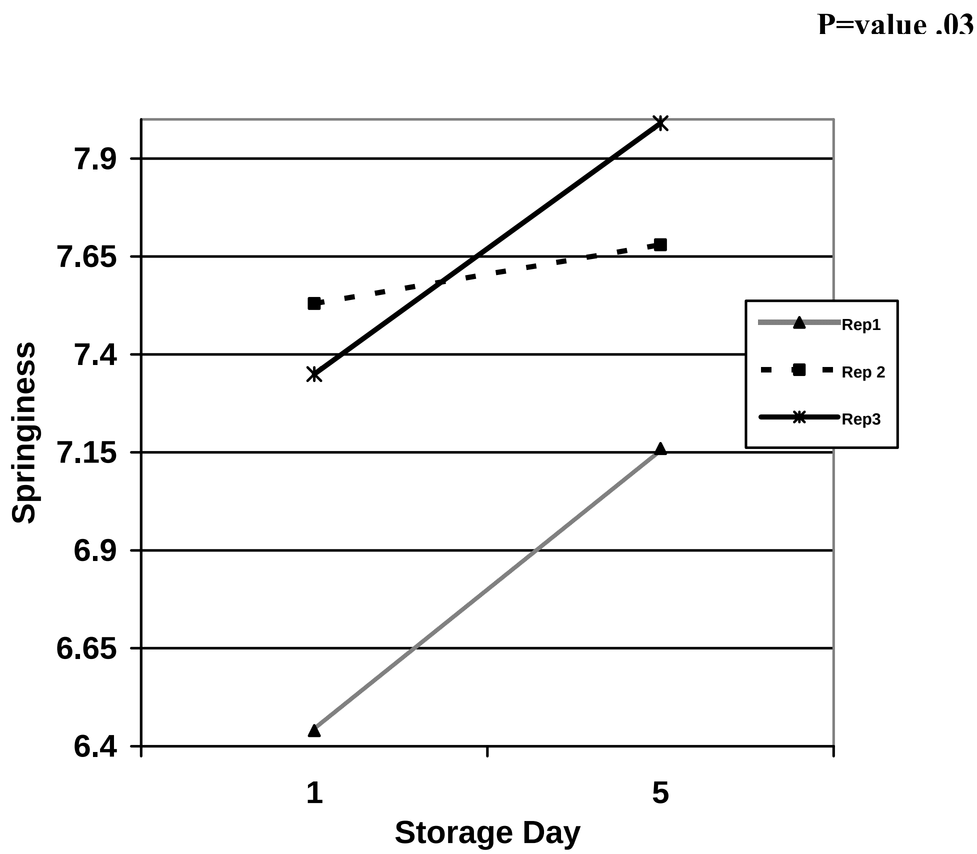


Fig. 13 - Least squares means for replication by storage day interaction for the sensory texture springiness.

Table 3- Least squares means for main effects for trained sensory flavor aromatics descriptive attributes[a].

Effect	Cooked Beefy/Brothy	Cooked Beef Fat	Serumy	Grainy	Browned	Sorghum
Treatment[b]	*0.0001*	*0.025*	*0.0001*	*0.0001*	*0.017*	*0.0002*
Control	5.00[f]	3.28[c]	1.86[d]	0.58[c]	1.27[c]	0.24[c]
Rosemary	4.68[de]	3.45[cd]	2.03[d]	0.71[c]	1.25[c]	0.25[c]
BHA/BHT	4.86[ef]	3.32[cd]	1.94[d]	0.58[c]	1.48[cd]	0.24[c]
0.25% sorghum	4.59[d]	3.51[d]	1.93[d]	0.73[c]	1.27[c]	0.37[cd]
0.50% sorghum	4.63[d]	3.40[cd]	1.45[c]	1.04[d]	1.70[d]	0.60[de]
1.0% sorghum	4.36[c]	3.40[cd]	1.40[c]	1.12[d]	1.55[cd]	0.68[e]
Fat Level, %[b]	*0.029*	*0.0001*	*0.39*	*0.35*	*0.58*	*0.66*
10	4.61[c]	3.16[c]	1.71[c]	0.85[c]	1.42[c]	0.37[c]
20	4.79[d]	3.44[d]	1.82[c]	0.75[c]	1.48[c]	0.37[c]
30	4.62[c]	3.58[d]	1.78[c]	0.72[c]	1.36[c]	0.44[c]
Storage Day[b]	*0.002*	*0.026*	*0.22*	*0.15*	*0.034*	*0.25*
1	4.78[d]	3.33[c]	1.81[c]	0.75[c]	1.33[c]	0.36[c]
5	4.57[c]	3.46[d]	1.73[c]	0.84[c]	1.51[d]	0.43[c]
Root MSE	*0.309*	*0.308*	*0.438*	*0.318*	*0.455*	*0.355*

[a]Aromatics: 0=none; 15=extremely intense.
[b]P-value from analysis of variance tables.
[cdef]Mean values within a column and a main effect followed by the same letter are not significantly different ($P > 0.05$).

Table 4- Least squares means for main effects for trained sensory flavor basic tastes, feeling factors, and texture descriptive attributes.

	Basic Tastes				Feeling Factors		Textures		
Effect	Salty[a]	Sour[a]	Bitter[a]	Sweet[a]	Metallic[a]	Astringent[a]	Hardness[b]	Juiciness[c]	Springiness[d]
Treatment[e]	*0.276*	*0.140*	*0.0069*	*0.252*	*0.06*	*0.09*	*0.0001*	*0.60*	*0.002*
Control	1.78^{f}	2.15^{f}	2.47^{f}	0.38^{f}	2.26^{f}	2.47^{f}	5.78^{f}	2.77^{f}	6.93^{f}
Rosemary	1.80^{f}	2.23^{f}	2.61^{fgh}	0.41^{f}	2.40^{f}	2.54^{f}	6.13^{g}	2.91^{f}	7.38^{g}
BHA/BHT	1.81^{f}	2.17^{f}	2.76^{h}	0.35^{f}	2.37^{f}	2.56^{f}	6.26^{g}	2.76^{f}	7.49^{g}
0.25% sorghum	1.79^{f}	2.17^{f}	2.49^{fg}	0.40^{f}	2.32^{f}	2.52^{f}	6.33^{g}	2.84^{f}	7.55^{g}
0.50% sorghum	1.79^{f}	2.20^{f}	2.57^{fg}	0.32^{f}	2.29^{f}	2.41^{f}	6.33^{g}	2.79^{f}	7.41^{g}
1.0% sorghum	1.78^{f}	2.27^{f}	2.65^{gh}	0.27^{f}	2.39^{f}	2.59^{f}	6.23^{g}	2.89^{f}	7.38^{g}
Fat Level, %[e]	*0.139*	*0.2001*	*0.048*	*0.007*	*0.340*	*0.117*	*0.0002*	*0.01*	*0.017*
10	1.78^{f}	2.25^{f}	2.66^{g}	0.27^{f}	2.36^{f}	2.57^{f}	6.35^{h}	2.70^{f}	7.48^{g}
20	1.80^{f}	2.17^{f}	2.59^{fg}	0.40^{g}	2.35^{f}	2.49^{f}	6.17^{g}	2.91^{g}	7.42^{g}
30	1.80^{f}	2.17^{f}	2.52^{f}	0.39^{g}	2.31^{f}	2.49^{f}	6.01^{f}	2.87^{g}	7.17^{f}
Storage Day[e]	*0.753*	*0.598*	*0.19*	*0.002*	*0.273*	*0.467*	*0.0001*	*0.09*	*0.001*
1	1.80^{f}	2.21^{f}	2.56^{f}	0.42^{g}	2.32^{f}	2.50^{f}	5.98^{f}	2.77^{f}	7.11^{f}
5	1.79^{f}	2.19^{f}	2.62^{f}	0.29^{f}	2.36^{f}	2.53^{f}	6.37^{g}	2.88^{f}	7.61^{g}
Root MSE	*0.043*	*0.137*	*0.331*	*0.186*	*0.159*	*0.195*	*0.311*	*0.468*	*0.242*

[a]0=none; 15=extremely intense.
[b]1=very soft; 15=very hard.
[c]1=none; 15=very juicy.
[d]1=not springy; 15=very springy.
[e]P-value from analysis of variance tables.
[fgh]Mean values within a column and a main effect followed by the same letter are not significantly different ($P > 0.05$).

Table 5- Least squares means for main effects for trained sensory flavor descriptive aftertastes attributes.

	Aftertastes							
Effect	Serumy[a]	Browned[a]	Sorghum[a]	Sour[a]	Bitter[a]	Sweet[a]	Metallic[a]	Astringent[a]
Treatment[b]	*0.009*	*0.2001*	*0.0008*	*0.67*	*0.002*	*0.48*	*0.16*	*0.24*
Control	0.30[cd]	0.99[c]	0.25[c]	1.70[c]	2.20[c]	0.15[c]	2.21[c]	2.19[c]
Rosemary	0.40[d]	0.97[c]	0.34[cd]	1.72[c]	2.33[c]	0.19[c]	2.35[c]	2.28[c]
BHA/BHT	0.40[d]	1.25[c]	0.33[cd]	1.72[c]	2.54[d]	0.10[c]	2.33[c]	2.37[c]
0.25% sorghum	0.38[d]	1.02[c]	0.39[d]	1.70[c]	2.32[c]	0.14[c]	2.21[c]	2.18[c]
0.50% sorghum	0.23[c]	1.27[c]	0.55[e]	1.64[c]	2.35[c]	0.17[c]	2.25[c]	2.23[c]
1.0% sorghum	0.30[cd]	1.08[c]	0.63[e]	1.65[c]	2.28[c]	0.15[c]	2.29[c]	2.28[c]
Fat Level, %[b]	*0.74*	*0.75*	*0.15*	*0.37*	*0.23*	*0.12*	*0.46*	*0.66*
10	0.35[c]	1.23[c]	0.39[c]	1.71[c]	2.39[c]	0.16[c]	2.30[c]	2.29[c]
20	0.34[c]	1.09[c]	0.49[c]	1.66[c]	2.32[c]	0.18[c]	2.27[c]	2.24[c]
30	0.32[c]	1.06[c]	0.37[c]	1.70[c]	2.30[c]	0.11[c]	2.25[c]	2.24[c]
Storage Day[b]	*0.0001*	*0.003*	*0.48*	*0.0001*	*0.0001*	*0.27*	*0.0001*	*0.04*
1	0.41[d]	0.99[c]	0.40[c]	1.62[c]	2.17[c]	0.14[c]	2.24[c]	2.20[c]
5	0.26[c]	1.20[d]	0.43[c]	1.76[d]	2.51[d]	0.16[c]	2.30[d]	2.31[d]
Root MSE	*0.160*	*0.366*	*0.281*	*0.180*	*0.240*	*0.133*	*0.198*	*0.263*

[a]0=none; 15=extremely intense.

[b]P-value from analysis of variance tables.

[cde]Mean values within a column and a main effect followed by the same letter are not significantly different ($P > 0.05$).

resulted in patties with lower levels of cooked beef/brothy flavor aromatics. The patties containing the medium and high levels of sorghum bran had less serumy flavor aromatics, and higher grainy and sorghum flavor aromatics when compared to the controls. A decrease in the serumy flavor attribute serves as an indicator of lipid oxidation as reported by Johnsen and Civille (1986) and Miller (2001). The increase in the grainy attribute is most likely due to the inherent grainy properties of the sorghum bran. As expected, the serumy and sorghum aftertastes followed the same trend as the serumy and sorghum flavor aromatics (Table 5). The ground beef patties containing the high level of sorghum were slightly more bitter and had a more bitter aftertaste than the control patties (Table 4 and 5).

Jenschke et al. (2004) found multiple flavor aromatics in ground beef patties that were not detected in our study. Jenschke et al. (2004) detected cardboardy, livery and painty flavor aromatics which are associated with lipid oxidation. The patties in our study did not contain high levels of these aromatics. As TBARS values were lower in our study when compared to Jenschke et al. (2004), high levels of these aromatics would not be expected.

Fat level effects on sensory scores showed that as fat level increased, all treatment patties had slightly higher levels of cooked beef fat and serumy flavor aromatics and had less bitter basic tastes (Table 3 and 4, respectively). Studies have attributed WOF aromatics to the lipid oxidation that occurs in the phospholipid membrane (Pearson et al., 1977; Igene and Pearson, 1979). Igene and Pearson (1979) evaluated the role of total lipids, phospholipids, and triglycerides to lipid oxidation and off-flavor development in cooked model systems of beef and of chicken dark and white meat. Their study found that total lipids and total phospholipids significantly ($P<0.01$) increased TBA values while significantly ($P<0.05$) reducing flavor scores. Thus, total lipids and total phospholipids were shown to be major contributors to the development of WOF in the cooked meat model systems. Igene and Pearson (1979) also reported that polyunsaturated fatty acids are involved in the heat induced degradation of lipids which results in off-flavors. In our study, increased fat level also affected the texture of the patties making them softer and juicier (Table 4).

As storage day increased, by-products of lipid oxidation are formed, suppressing the sweet flavor aromatic in ground beef patties (Johnsen and Civille, 1986). Similar results were shown in our study (Table 4). Storage day effects on sensory scores showed that over time, all treatment patties had lower levels of cooked beef/brothy flavor aromatics and higher levels of cooked beef fat and browned flavor aromatics (Table 3). Over time, the bitter attribute increased for all treatments which would occur with the onset of lipid oxidation and the inherent bitter taste of the sorghum bran (Miller, 2001). As storage day increased, the patties were harder and more springy. Hardness refers to the amount of force required to bite through a sample. The increase in hardness and springiness is most likely due to the physical denaturation of proteins during treatment ingredient mixing. Loss of protein function allowed for binding of muscle proteins thus producing a protein matrix that leads to a more cohesive and springy patty. Eckert et al. (1997) reported a similar storage day effect for the hardness attribute in ground beef patties.

A treatment by storage day interaction was observed for cooked beef/brothy flavor aromatic (Fig.14). For all treatments (except low sorghum bran), as time increased, cooked beef/brothy scores decreased, most likely due to lipid oxidation. Numerous investigators have found similar results (Johnsen and Civille, 1986; Ecket et al. 1997; Miller, 2001; Jenschke et al. 2004). A fat level by storage day interaction was observed for the serumy flavor aromatic (Fig. 15). As time increased, the serumy flavor decreased significantly in the patties containing the high fat level.

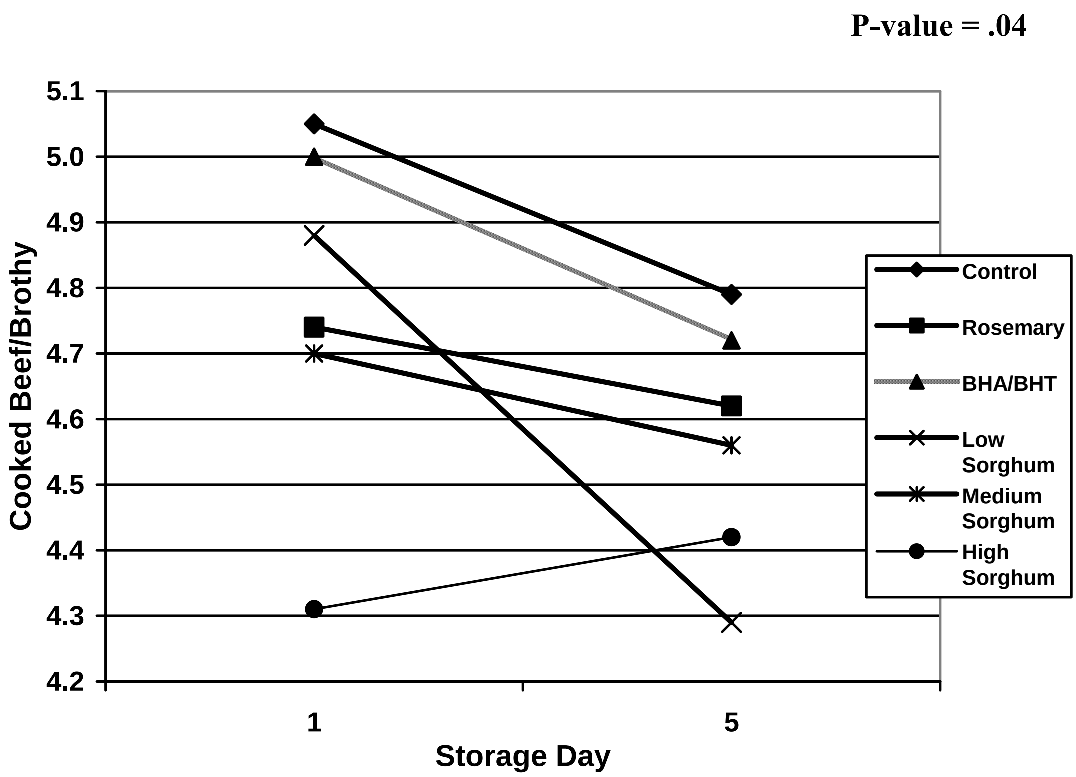


Fig. 14 - Least squared means for treatment by storage day interaction for the sensory attribute cooked beef/brothy.

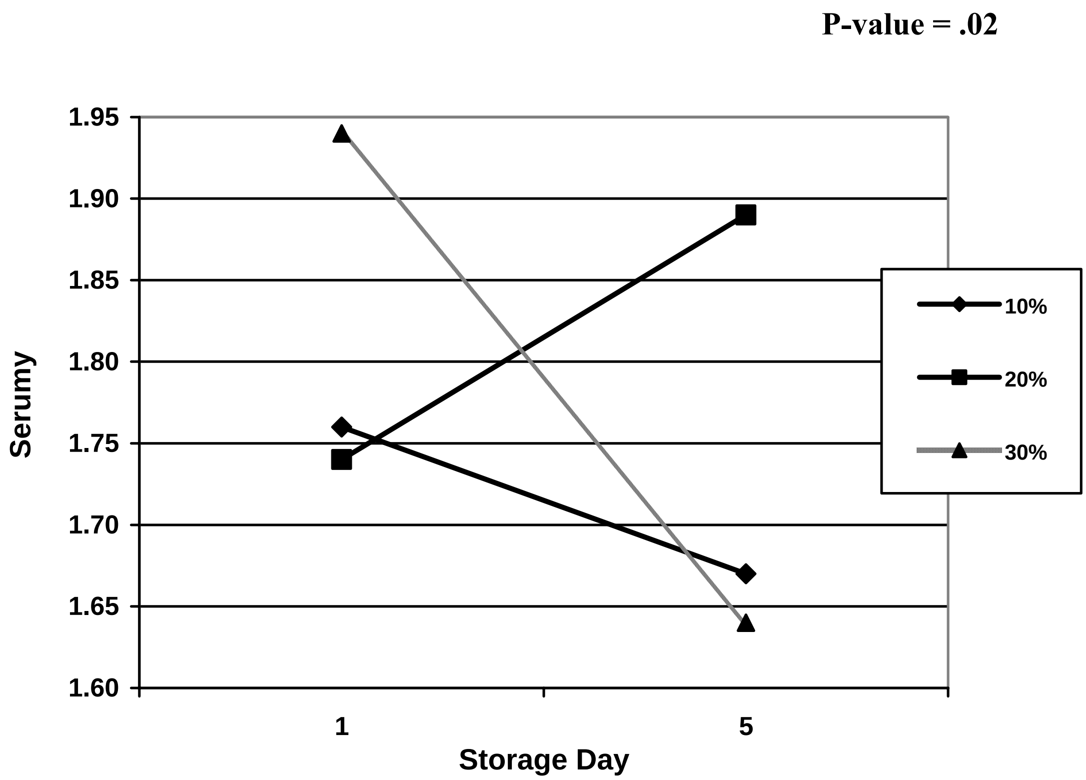


Fig. 15 - Least squared means for fat level by storage day interaction for the sensory attribute serumy.

CHAPTER V

SUMMARY

Chemical Data

Results from this study show that the ground beef patties containing BHA/BHT, rosemary, and sorghum had lower TBARS values after 1, 3, and 5 days of storage when compared to control patties at all fat levels. The ground beef patties with 10% fat had he highest TBARS values. The TBARS values recorded in this study were not greater than 1 after five days of storage, demonstrating oxidation was occurring in the patties, but not at a rapid rate. The low TBARS values can be attributed to the freshness of the raw material and the low levels of susceptible PUFA concentrations. The addition of sorghum tended to increase pH; patties containing the high level of sorghum had the highest pH values. As storage time increased, pH increased slightly. This interaction is associated with the solubilization of the hydrophobic compounds in the sorghum during storage.

Color Data

As fat level increased, ground beef patties were lighter, redder, and more yellow. Increased storage days resulted in ground beef patties that were darker, less red and yellow, had higher amounts of discoloration, and the discoloration color became darker. The addition of rosemary and BHA/BHT resulted in patties with higher sensory lean color scores, slightly less discoloration, and the discoloration was lighter. Sorghum bran addition at the high level resulted in darker ground beef patties that were less red and yellow. The trained color panel found the patties containing sorghum bran to have similar discoloration percentages as the control patties, but the color of the discoloration tended to be lighter. When compared to sorghum levels used in previous studies, the high level of sorghum used in this study had less of a negative effect on sensory color characteristics.

Sensory Data

The addition of rosemary and BHA/BHT to ground beef patties resulted in similar scores for sensory flavor and basic taste attributes when compared to the control patties, except patties containing rosemary had less cooked beef/brothy flavor aromatics than control patties. The addition of sorghum bran resulted in patties with lower levels of cooked beef/brothy flavor aromatics. The patties containing the medium and high level of sorghum had less serumy flavor aromatics and higher grainy and sorghum flavor aromatics when compared to control patties. Patties containing the high level of sorghum were slightly more bitter than control patties. Sorghum treated patties were also found to be harder and more springy when compared to control patties. As the fat level increased, all treated patties had slightly higher levels of cooked beef fat and serumy aromatics, less bitter basic tastes, and the patties were softer and jucier. As storage day increased, all patties had lower levels of cooked beef/brothy flavor aromatics and higher levels of cooked beef fat and browned aromatics.

CHAPTER VI

CONCLUSIONS

Data from this study indicate that the addition of sorghum bran from low to high levels had comparable antioxidant properties to the commonly used food antioxidants, BHA/BHT and rosemary. However, as treated patties had low levels of oxidation, even with up to five days of storage, significant differences between treatments were not found. Except for the control patties, oxidation rates and levels were very low within the patties at different fat levels and over storage time.

The addition of sorghum bran reduced TBARS values over time and did not drastically affect color and sensory flavor attributes. The addition of the high sorghum bran level resulted in slightly lower color scores and slightly increased bitter basic taste. Further research to isolate and extract the antioxidant components (anthocyanins and tannins) might reduce the negative effects on color and sensory characteristics of the higher sorghum level by removing unwanted or unnecessary compounds. Information from this and future studies will help enable the future commercial application of sorghum bran as targeted food ingredients to improve food quality and human health.

LITERATURE CITED

Addis, P. 1986. Occurrence of lipid oxidation products in foods. Food Chem. Toxicol. 24: 1021.

Addis, P. and S. Park. 1989. Role of lipid oxidation products in atherosclerosis. Page 247-330 in Food Toxicol. Academic Press, New York.

American Meat Institute. 1993. Meat Facts. Washington, DC. 25.

AMSA. 1991. Guidelines for Meat Color Evaluation. Savoy, IL: American Meat Science Association.

AMSA. 1995. Research Guidelines for Cookery, Sensory Evaluation and Instrumental Measurements of Fresh Meat. Chicago: American Meat Science Association and National Live Stock and Meat Board.

Anderson, H., G. Bertelsen, L. Boezh-Soerensen, C. Shek, and L. Skibsted. 1988. Meat Science. 22: 283.

Anderson, H., G. Bertelsen, L. Boezh-Soerensen, C. Shek, and L. Skibsted. 1990. Meat Science. 28: 77.

Anton, M., P. Gatellier, and M. Renerre. 1996. Meat colour and lipid oxidation. Meat Focus International. 5: 159-160.

Awika, J. M. 2000. Sorghum phenols as antioxidants. M.S. Thesis, Texas A&M Univ., College Station.

Awika, J. M. 2003. Antioxidant properties of sorghum. Ph.D. Diss., Texas A&M Univ., College Station.

Awika, J. M., L. Rooney, X. Wu, R. Prior, and L. Cisneros-Zevallos. 2003. Screening methods to measure antioxidant activity of sorghum and sorghum products. J. Agric. Food Chem. 51: 6657-6662.

Awika, J. M. and L. Rooney. 2004. Sorghum phytochemicals and their potential impact on human health. Phytochemistry. 65: 1199-1221.

Awika, J. M., L. Rooney, R. Waniska. 2004. Properties of 3-deoxyanthocyanins from sorghum. J. Agric. Food. Chem. 52: 4388-4394.

Bors, W., C. Michel, K. Stettmaier. 2000. Electron paramagnetic resonance studies of radical species of proanthocyanidins and gallate esters. Arch. Biochem. Biophys. 374: 347-355.

Bors, W., L. Foo, N. Hertkorn, C. Michel, and K. Stettmaier. 2001. Chemical studies of proanthocyanidins and hydrolyzable tannins. Antioxidants and Redox Signalling. 3:995-1008.

Buettner, G.R. 1993. The pecking order of free radicals and antioxidants: Lipid peroxidation, alpha-tocopherol, and ascorbate. Arch. Biochem. Biophys. 300: 535-542.

Carbonaro, M., F. Virgili, and E. Carnovale. 1996. Evidence for protein-tannin interaction in legumes: Implications in the antioxidants properties of faba bean tannins. Lebensm. Wiss. Technol. 29: 743-750.

Chambers IV, E., J. Bowers, and E. Smith. 1992. Flavor of cooked, ground turkey patties with added sodium tripolyphosphate as perceived by sensory panels with differing phosphate sensitivity. J. Food Sci. 57: 521-523.

Chimi, H., J. Cillard, P. Cillard, and M. Rahamani. 1991. Peroxyl and hydroxyl radical scavenging activity of some natural phenolic antioxidants. J. Am. Oil Chem. Soc. 68: 307-312.

Civille, G. and B. Lyon. 1996. Aroma and Flavor Lexicon for Sensory Evaluation. American Society for Testing and Materials, West Conshohocken, PA.

Cook, N. and S. Samman. 1996. Flavonoids-Chemistry, metabolisim, cardioprotective effects, ad dietary sources. Nutr. Biochem. 7: 66-76.

Djenane, D., A. Sanchez-Escalante, J. Beltran, and P. Roncales. 2003. Extension of the shelf life of beef steaks packaged in a modified atmosphere by treatment with rosemary and displayed under UV-free lighting. Meat Sci. 64: 417-426.

Dupuy, H., M. Bailey, A. St. Angelo, J. Vercellotti, and G. Legendre. 1987. Mechanism of iron catalysis of lipid oxidation in warmed-over flavor of meat. Page 165 in Warmed-Over Flavor of Meat. Academic Press, New York.

Eckert, L.A., J.V. Maca, R.K. Miller and G.R. Acuff. 1997. Sensory, microbial and chemical characteristics of fresh aerobically stored ground beef containing sodium lactate and sodium propionate. J. Food Sci. 62: 429-433.

Enser M. 2001. Muscle lipids and meat quality. Pages 243-245 in Proceedings of Annual Meeting of the British Society of Animal Science. BSAS, Edinburgh, UK.

Finley, J. and P. Given. 1986. Technological necessity of antioxidants in the food industry. Food Chem. Toxicol. 24: 999-1006.

Folch, J., M. Lee, and G. Sloane-Stanley. 1957. A simple method for the isolation and purification of total lipids from animal tissues. Biochem. J. 226: 497-52001.

Gous, F. 1989. Tannins and phenols in black sorghum. Ph.D. Diss., Texas A&M Univ., College Station.

Hagerman, A.E., K.M. Riedl, G.A. Jones, K.N. Sovik, N.T. Ritchard, P.W. Hartzfeld, and T.K. Riechel. 1998. High molecular weight plant polyphenolics (tannins) as biological antioxidants. J. Agric. Food Chem. 46: 1887-1892.

Han, J. and K. Rhee. 2002. Enhancement of oxidative storage stability of unsalted and salted beef products using non-culinary herb extracts. Available at http://animalscience.tamu.edu/ansc/beef/bcrt/han.pdf, Accessed August 21 2005.

Harborne, J.B. 1988. The anthocyanins. Page 1-20 in The Flavonoids. J.B. Harborne, ed. Academic Press, London.

Higgs, J.D. 2000. The changing nature of red meat: 20 years of improving nutritional quality. Trends in Food Sci. and Tech. 11: 85–95.

Husain, S., J. Cillard, and P. Cillard. 1987. Hydroxyl radical scavenging activity of flavonoids. Phytochem. 26: 2489-2491.

Igene, J.O., and A.M. Pearson. 1979. Role of phospholipids and triglycerides in warmed-over flavor development in meat model systems. J. Food Sci. 44: 1285-1290.

Igene, J.O., J.A. King, A.M. Pearson, and J.I. Gray. 1979. Influence of heme pigments, nitrite and non-heme iron on development of warmed-over flavor (WOF) in cooked meats. J. Agric. Food Chem. 27.

Jennings, W. 1987. Analytical Gas Chromatography. Academic Press, New York.

Jenschke, B. 2004. Chemical, Color, and Sensory Attributes of Sorghum Bran-enhanced beef patties in a high oxygen environment. M.S. Thesis, Texas A&M Univ., College Station.

Jimenez-Ramsye, L., J. Rogler, T. Housley, L. Butler, and R. Elkin. 1994. Absorption and distribution of 14C-labeled condensed tannins and related sorghum phenolics in chickens. J. Agric. Food Chem. 42: 963-967.

Johnson, P.B. and G.V. Civille. 1986. A standardized lexicon of meat WOF descriptors. Journal of Sensory Studies. 1: 99-104.

Kamei, H., T. Kojima, M. Hasegawa, T. Koide, T. Umeda, T. Yukawa, and K. Terabe. 1995. Suppression of tumor cell growth by anthocyanins in-vitro. Cancer Invest. 13(6): 590-594.

Kanner, J., J. German, and J. Kinsella. 1987. Initiation of lipid peroxidation in biological systems. Crit. Rev Food Sci Nutr. 25: 317-364.

Kanner, J. 1994. Oxidative processes in meat and meat products: Quality implications. Meat Sci. 36: 169-189.

Karaivanova, M., D. Drenska, and R. Ovcharov. 1990. A modification of the toxic effects of platinum complexes with anthocyanins. Eksp. Med. Morfol. 29(2): 19-24.

Kakouri, A. and G. Nychas. 1994. Storage of poultry meat under modified atmospheres or vacuum packs; possible role of microbial metabolites as indicator of spoilage. J. App. Bacteriol. 76: 163-172

Lietti, A., A. Cristoni, and M. Picci. 1976. Studies of *Vaccinium myrtillus* anthocyanosides. Vasoprotective and anti-inflammatory activity. Arzneim-Forsch. 26(5): 829-832.

Lu, Y. and Y. Foo. 2001. Antioxidant activities of polyphenols from sage (*Salvia officinalis*). Food Chem. 75: 197-202.

Marshal, T., and R. Roberts. 1990. In vitro and in vivo assessment of lipid peroxidation of infant nutrient preparations: Effect of nutrition on oxygen toxicity. J. Am. College Nutr. 9: 190-199.

Marsili, R. 1997. Techniques for Analyzing Food Aroma. Marcel Dekker, Inc., New York.

Marsili, R. 2002. Flavor, Fragrance, and Odor Analysis. Marcel Dekker, Inc., New York.

Meilgaard, M., G. Civille, and B.Carr. 1991. Sensory Evaluation Techniques, 2nd ed. Boca Raton: CRC Press, Inc.

Miller, R.K. 2001. Beef Flavor: A White Paper. A paper prepared for the National Cattlemen's Beef Association, Centennial, CO.

Moody, W.G. 1983. Beef flavor-a review. Food Technol. 37: 227.

Morrison, W. and L. Smith. 1964. Preparation of fatty acid methyl esters and dimethylacteals from lipids with boron fluoride-methanol. J. Biol. Chem. 226: 497-52001.

Morrissey, P.A., D.J. Buckley, P.J. Sheehy, and F.J Monahan. 1994. Vitamin E and meat quality. Proc. Nutr. Soc. 53(2): 289-295.

Morrissey, P.A., K.G. Sheehy, J.P. Kerry, and D.J. Buckley. 1998. Lipid stability in meat and meat products. Meat Sci. 49(S1): S73-S86.

Movileanu, I., B. Hafley, and J. Keeton. 2004. Reduction of Oxidation in Irradiated Ground Beef Patties with Natural Antioxidants. Meat Science. In Press.

Nishigaki, I., M. Hagihar, M. Maseki, Y. Tomoda, K. Nagayama, T. Nakashima, and K. Yagi. 1984. Effect of linoleic acid hydroperoxide on uptake of low desnity lipoproteins by cultured smooth muscle cells from rabbit aorta. Biochem. Int. 8: 501.

Packer L. 1993. Health effects of nutritional antioxidants. Free Rad Biol Med. 15:685-686.

Parr, A. and G. Bolwell. 2000. Phenols in the plant and in man. The potential for possible nutritional enhancement of the diet by modifying the phenols content or profile. J. Sci. Food Agric. 80: 985-1012.

Pearson, A.M., J.D. Love, and F.B. Shortland. 1977. Warmed-over flavor in meats, poultry, and fish. Adv. Food Res. 23: 1-74.

Pellegrini, N., M. Serafini, B. Colombi, D. Del Rio, S. Salvatore, M. Bianchi, and F. Brighenti. 2003. Total antioxidant capacity of plant foods, beverages, and oils consumed in Italy assessed by three *in vitro* assays. J. Nutr. 133: 2812-2819.

Rhee, K.S. 1978. Minimization of further lipid peroxidation in the distillation of 2-thiobarbituric acid test of fish and meat. J. Food Sci. 43:1776-1778, 1781.

Robbins, K., J. Jensen, K. Ryan, C. Homco-Ryan, F. McKeith, and M. Brewer. 2003a. Consumer attitude towards beef and acceptability of enhanced beef. Meat Sci. 65(2): 721-729.

Robbins, K., J. Sebranek, T. Houser, and J. Sewalt. 2004. Relative antioxidant effectiveness of rosemary extract based products in pork sausage in Proceedings of the 2004 IFT Annual Meeting. July 12-16, 2004. Las Vegas, NV.

Roubel, W. and A. Tappel. 1966. Damage to proteins, enzymes, and amino acids by peroxidizing lipids. Arch. Biochem. Biophys. 113: 5.

Santos-Buelga, C. and A. Scalbert. 2000. Proanthocyanidins and tannin-like compounds: Nature, occurrence, dietary intake, and effects on nutrition and health. J. Sci. Food Agric. 80: 1094-1117.

Sasaguri, Y., M. Morimatsu, T. Nakashima, O. Tokunage, and K. Yagi. 1985. Difference in the inhbitory effect of linoleic acid hydroperoxide on prostacyclin biosynthesis between cultured endothelial cells from human umbilical cord vein and cultured smooth muscle cells from rabbit aorta. Biochem. Intl. 11: 517.

Shahidi, F. and L. Rubin. 1986. Meat flavor volatiles: A review of the composition, techniques of analysis, and sensory evaluations. CRC Crit. Rev. in Food Sci. and Nutr. 24: 141.

Shahidi, F. 1994. Flavor of Meat and Meat Products. Blackie Academic and Professional, London.

Shahidi, F. 2000. Antioxidants in food and food antioxidants. Nahrung. 4:158-163.

Shand, P.J., J.N. Sofos, and G.R. Schmidt. 1994. Kappa-Carrageenan, sodium chloride and temperature affect yield and texture of structured beef roll. J. Food Sci. 59: 282–287.

Smith, L. and B. Johnson. 1989. Free Rad. Biol. Med. 7:285.

Sweeny, J.G., and G.A. Iacobucci. 1981. Synthesis of anthocyanidins-III: Total sythesis of apigeninidin and luteolinidin chlorides. Tetrahedron. 37: 1481-1483.

Tarladgis, B.G., B.M. Watts, M.T. Younathan, and L.R. Dugan, Jr. 1960. Distillation method for the quantitative determination of malonaldehyde in rancid foods. J. Am Oil Chem. Soc. 37: 44-48.

Tims, M.J. and B.M. Watts. 1958. Protection of cooked meats with phosphates. Food Tech. 12: 240-243.

Tsuda, T., K. Ohshima, J. Kawakishi, and J. Osawa. 1994. Antioxidative pigments isolated from seeds of *Phaseolus vulgaris*. J. Agric. Food Chem. 42: 248-251.

Vega, J., D. Dios, and M. Brewer. 1994. Dectectable odor thresholds of selected lipid oxidation compounds at various temperatures in a gelatin model system. J. of Food Lipids. 1: 229-245.

Verbeke, W., M. Van Oeckel, N. Warnants, J. Viaene, and C. Boucque. 1999. Consumer perception, facts and possibilities to improve acceptability of health and sensory characteristics of pork. Meat Sci. 53: 77–99.

Wang, H., G. Cao, and R. Prior. 1997. Oxygen radical absorbing capacity of anthocyanins. J. Agric. Food Chem. 45: 304-309.

Wilson, B., A. Pearson, and F. Shorland. 1976. Effect of total lipids and phospholipids on warmed over flavor in red and white muscles from several different species as measured by TBA analysis. J. Agric. Food Chem. 24:7.

Yagi, K. 1987. Lipid peroxides and human disease. Chem. Phys. Lipids. 43: 33.

APPENDIX A

AOV TABLES

Table A-1. ANOVA table for FAME

General Linear Models Procedure

Class	Levels	Values
LEVEL	3	10 20 30

Number of observations in data set = 9

Dependent Variable: MYRISTIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.03846667	0.01923333	0.03	0.9732
Error	6	4.23553333	0.70592222		
Corrected	Total	8	4.27400000		

R-Square	C.V.	Root MSE	MYR Mean
0.009000	24.37694	0.84019178	3.44666667

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	0.03846667	0.01923333	0.03	0.9732

Dependent Variable: PALMITIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	15.52055556	7.76027778	1.83	0.2401
Error	6	25.48653333	4.24775556		
Corrected	Total	8	41.00708889		

R-Square	C.V.	Root MSE	PALM Mean
0.378485	8.092259	2.06100838	25.46888889

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	15.52055556	7.76027778	1.83	0.2401

Dependent Variable: PALMITOLEIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.17486667	0.08743333	0.55	0.6043
Error	6	0.95653333	0.15942222		
Corrected	Total	8	1.13140000		

R-Square	C.V.	Root MSE	PALMO Mean
0.154558	16.09988	0.39927712	2.48000000

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	0.17486667	0.08743333	0.55	0.6043

Dependent Variable: STEARIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	4.17620000	2.08810000	0.40	0.6874
Error	6	31.38080000	5.23013333		
Corrected	Total	8	35.55700000		

R-Square	C.V.	Root MSE	STEAR Mean
0.117451	12.60490	2.28694848	18.14333333

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	4.17620000	2.08810000	0.40	0.6874

Dependent Variable: TRANS-VACCINIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	20.66148889	10.33074444	4.55	0.0627
Error	6	13.61360000	2.26893333		
Corrected	Total	8	34.27508889		

R-Square	C.V.	Root MSE	TRANSV Mean
0.602814	21.92928	1.50629789	6.86888889

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	20.66148889	10.33074444	4.55	0.0627

Dependent Variable: VACCINIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.01280000	0.00640000	0.31	0.7474
Error	6	0.12560000	0.02093333		
Corrected	Total	8	0.13840000		

R-Square	C.V.	Root MSE	VAC Mean
0.092486	12.50867	0.14468356	1.15666667

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	0.01280000	0.00640000	0.31	0.7474

Dependent Variable: OLEIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	1.52042222	0.76021111	2.83	0.1366
Error	6	1.61420000	0.26903333		
Corrected	Total	8	3.13462222		

R-Square	C.V.	Root MSE	OLEIC Mean
0.485042	1.588890	0.51868423	32.64444444

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	1.52042222	0.76021111	2.83	0.1366

Dependent Variable: LINOLEIC

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.24426667	0.12213333	0.21	0.8145
Error	6	3.45113333	0.57518889		
Corrected	Total	8	3.69540000		

R-Square	C.V.	Root MSE	LINO Mean
0.066100	24.94777	0.75841208	3.04000000

Source	DF	Type III SS	Mean Square	F Value	Pr > F
LEVEL	2	0.24426667	0.12213333	0.21	0.8145

Table A-2. ANOVA table for TBARS values, mg malonaldehyde/g

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	4	0 1 3 5
FAT	3	10 20 30

Number of observations in data set = 216

Dependent Variable: TBARS

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	57	17.39116312	0.30510812	7.98	0.0001
Error	157	6.00109890	0.03822356		
Corrected	Total	214	23.39226202		

R-Square	C.V.	Root MSE	TBARS Mean
0.743458	54.60549	0.19550846	0.35803814

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	5.57346055	2.78673027	72.91	0.0001
TRT	5	2.41181901	0.48236380	12.62	0.0001
DAY	3	0.93721924	0.31240641	8.17	0.0001
FAT	2	0.35012060	0.17506030	4.58	0.0117
REP*TRT	10	4.01682362	0.40168236	10.51	0.0001
REP*DAY	6	0.92074580	0.15345763	4.01	0.0009
REP*FAT	4	1.32434879	0.33108720	8.66	0.0001
TRT*DAY	15	1.01010063	0.06734004	1.76	0.0447
TRT*FAT	10	0.81027185	0.08102719	2.12	0.0258

Table A-3. ANOVA table for pH values

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	4	0 1 3 5
FAT	3	10 20 30

Number of observations in data set = 216

Dependent Variable: PH

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	22	13.46912096	0.61223277	78.92	0.0001
Error	193	1.49725244	0.00775778		
Corrected	Total	215	14.96637341		

R-Square	C.V.	Root MSE	PH Mean
0.899959	1.388068	0.08807829	6.34538580

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	2.99745720	1.49872860	193.19	0.0001
TRT	5	0.24976986	0.04995397	6.44	0.0001
DAY	3	2.17520962	0.72506987	93.46	0.0001
FAT	2	0.34620990	0.17310495	22.31	0.0001
REP*DAY	6	7.63243498	1.27207250	163.97	0.0001
REP*FAT	4	0.06803940	0.01700985	2.19	0.0713

Table A-4. ANOVA table for L* Values

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	4	0 1 3 5
FAT	3	10 20 30

Number of observations in data set =216

Dependent Variable: L* Value

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	22	2072.28032675	94.19456031	21.36	0.0001
Error	193	851.06515946	4.40966404		
Corrected	Total	215	2923.34548621		

R-Square	C.V.	Root MSE	L* Value Mean
0.708873	4.382563	2.099905	47.91533951

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	23.60056924	11.80028462	2.68	0.0714
TRT	5	193.02246831	38.60449366	8.75	0.0001
DAY	3	241.58521214	80.52840405	18.26	0.0001
FAT	2	1306.30569208	653.15284604	148.12	0.0001
REP*DAY	6	246.00104064	41.00017344	9.30	0.0001
REP*FAT	4	61.76534434	15.44133609	3.50	0.0087

Table A-5. ANOVA table a* Values

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	4	0 1 3 5
FAT	3	10 20 30

Number of observations in data set = 216

Dependent Variable: a* Value

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	32	2507.02000967	78.34437530	29.57	0.0001
Error	183	484.76877963	2.64900972		
Corrected	Total	215	2991.78878930		

R-Square	C.V.	Root MSE	a* Value Mean
0.837967	9.087192	1.62757787	17.91067901

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	36.89069640	18.44534820	6.96	0.0012
TRT	5	542.76386523	108.55277305	40.98	0.0001
DAY	3	1562.50266091	520.83422030	196.61	0.0001
FAT	2	126.00718035	63.00359017	23.78	0.0001
REP*TRT	10	66.16140545	6.61614055	2.50	0.0078
REP*DAY	6	147.14694064	24.52449011	9.26	0.0001
REP*FAT	4	25.54726070	6.38681517	2.41	0.0508

Table A-6. ANOVA table for b* Values

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	4	0 1 3 5
FAT	3	10 20 30

Number of observations in data set = 216

Dependent Variable: b* Value

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	36	483.15804043	13.42105668	23.38	0.0001
Error	179	102.75868714	0.57407088		
Corrected	Total	215	585.91672757		

R-Square	C.V.	Root	MSE	AVEB	Mean
0.824619	7.583675	0.75767465	9.99086420		

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	23.22056368	11.61028184	20.22	0.0001
TRT	5	84.08449979	16.81689996	29.29	0.0001
DAY	3	126.24244691	42.08081564	73.30	0.0001
FAT	2	217.45072665	108.72536332	189.39	0.0001
REP*TRT	10	14.26769928	1.42676993	2.49	0.0082
REP*FAT	4	6.22839558	1.55709889	2.71	0.0316
TRT*FAT	10	11.66370854	1.16637085	2.03	0.0325

Table A-7. ANOVA table for the sensory aromatic cooked beef/brothy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Cooked beef/brothy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	10.51477970	0.24452976	2.36	0.0010
Error	63	6.53821615	0.10378121		
Corrected	Total	106	17.05299585		

R-Square	C.V.	Root MSE	Cooked beef/brothy Mean
0.616594	6.887601	0.32215091	4.67725857

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	1.01473980	0.50736990	4.89	0.0106
TRT	5	3.39287417	0.67857483	6.54	0.0001
DAY	1	1.26707232	1.26707232	12.21	0.0009
FAT	2	0.67788620	0.33894310	3.27	0.0447
REP*TRT	10	0.74853811	0.07485381	0.72	0.7015
REP*DAY	2	0.90531219	0.45265610	4.36	0.0168
REP*FAT	4	0.41630603	0.10407651	1.00	0.4128
DAY*TRT	5	1.09258968	0.21851794	2.11	0.0763
DAY*FAT	2	0.12208373	0.06104186	0.59	0.5584
FAT*TRT	10	0.64009685	0.06400969	0.62	0.7939

Table A-8. ANOVA table for the sensory aromatic cooked beef fat

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Cooked beef fat

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	11.81612358	0.27479357	3.14	0.0001
Error	63	5.52131671	0.08763995		
Corrected	Total	106	17.33744029		

R-Square	C.V.	Root MSE	Cooked beef fat Mean
0.681538	8.734282	0.29604045	3.38940810

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	4.33216237	2.16608118	24.72	0.0001
TRT	5	0.66387347	0.13277469	1.52	0.1979
DAY	1	0.40614174	0.40614174	4.63	0.0352
FAT	2	3.30388527	1.65194263	18.85	0.0001
REP*TRT	10	0.77611113	0.07761111	0.89	0.5513
REP*DAY	2	0.29302657	0.14651328	1.67	0.1961
REP*FAT	4	0.40927300	0.10231825	1.17	0.3337
DAY*TRT	5	0.59699388	0.11939878	1.36	0.2505
DAY*FAT	2	0.45201658	0.22600829	2.58	0.0839
FAT*TRT	10	1.27005685	0.12700568	1.45	0.1802

Table A-9. ANOVA table for the sensory aromatic serumy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Serumy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	17.33843742	0.40321947	3.56	0.0001
Error	63	7.12724794	0.11313092		
Corrected	Total	106	24.46568536		

R-Square	C.V.	Root MSE	Serumy Mean
0.708684	18.95841	0.33634940	1.77414330

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	4.70908047	2.35454023	20.81	0.0001
TRT	5	6.19006739	1.23801348	10.94	0.0001
DAY	1	0.17086436	0.17086436	1.51	0.2237
FAT	2	0.21146356	0.10573178	0.93	0.3981
REP*TRT	10	1.28993674	0.12899367	1.14	0.3478
REP*DAY	2	1.90879614	0.95439807	8.44	0.0006
REP*FAT	4	0.07711389	0.01927847	0.17	0.9527
DAY*TRT	5	0.47481422	0.09496284	0.84	0.5268
DAY*FAT	2	0.88019532	0.44009766	3.89	0.0255
FAT*TRT	10	1.17891364	0.11789136	1.04	0.4198

Table A-10. ANOVA table for the sensory aromatic grainy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Grainy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	9.81015850	0.22814322	2.42	0.0007
Error	63	5.94555282	0.09437385		
Corrected	Total	106	15.75571132		

R-Square	C.V.	Root MSE	Grainy Mean
0.622641	38.83901	0.30720328	0.79096573

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.11670151	0.05835076	0.62	0.5421
TRT	5	4.71082362	0.94216472	9.98	0.0001
DAY	1	0.20027600	0.20027600	2.12	0.1501
FAT	2	0.21274867	0.10637434	1.13	0.3304
REP*TRT	10	1.07232255	0.10723226	1.14	0.3505
REP*DAY	2	0.86455037	0.43227518	4.58	0.0139
REP*FAT	4	0.12669720	0.03167430	0.34	0.8530
DAY*TRT	5	0.83644358	0.16728872	1.77	0.1314
DAY*FAT	2	0.32286839	0.16143419	1.71	0.1890
FAT*TRT	10	1.09565974	0.10956597	1.16	0.3337

Table A-11. ANOVA table for the sensory aromatic browned

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Browned

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	15.00651972	0.34898883	1.46	0.0862
Error	63	15.10777935	0.23980602		
Corrected	Total	106	30.11429907		

R-Square	C.V.	Root MSE	Browned Mean
0.498319	34.48364	0.48969993	1.42009346

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	4.13340752	2.06670376	8.62	0.0005
TRT	5	3.03114209	0.60622842	2.53	0.0378
DAY	1	0.93793564	0.93793564	3.91	0.0523
FAT	2	0.21467401	0.10733700	0.45	0.6412
REP*TRT	10	0.94969021	0.09496902	0.40	0.9437
REP*DAY	2	2.28027200	1.14013600	4.75	0.0119
REP*FAT	4	1.19428912	0.29857228	1.25	0.3011
DAY*TRT	5	0.75796039	0.15159208	0.63	0.6759
DAY*FAT	2	0.25460947	0.12730474	0.53	0.5907
FAT*TRT	10	1.09445049	0.10944505	0.46	0.9115

Table A-12. ANOVA table for the sensory aromatic sorghum

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Sorghum

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	9.76521110	0.22709793	1.60	0.0440
Error	63	8.94314300	0.14195465		
Corrected	Total	106	18.70835410		

R-Square	C.V.	Root MSE	Sorghum Mean
0.521971	96.52255	0.37676870	0.39034268

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	2.10590660	1.05295330	7.42	0.0013
TRT	5	3.40641021	0.68128204	4.80	0.0009
DAY	1	0.14892371	0.14892371	1.05	0.3096
FAT	2	0.11830290	0.05915145	0.42	0.6610
REP*TRT	10	1.10205303	0.11020530	0.78	0.6509
REP*DAY	2	1.40242736	0.70121368	4.94	0.0102
REP*FAT	4	0.55625390	0.13906347	0.98	0.4251
DAY*TRT	5	0.37293195	0.07458639	0.53	0.7561
DAY*FAT	2	0.01766597	0.00883299	0.06	0.9397
FAT*TRT	10	0.80756906	0.08075691	0.57	0.8330

Table A-13. ANOVA table for the sensory flavor basic taste salty

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Salty

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	0.16597540	0.00385989	2.14	0.0029
Error	63	0.11365596	0.00180406		
Corrected	Total	106	0.27963136		

R-Square	C.V.	Root MSE	Salty Mean
0.593551	2.365413	0.04247426	1.79563863

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.01337406	0.00668703	3.71	0.0301
TRT	5	0.01128902	0.00225780	1.25	0.2961
DAY	1	0.00027424	0.00027424	0.15	0.6979
FAT	2	0.00797563	0.00398782	2.21	0.1181
REP*TRT	10	0.01244014	0.00124401	0.69	0.7302
REP*DAY	2	0.07270066	0.03635033	20.15	0.0001
REP*FAT	4	0.00809286	0.00202321	1.12	0.3544
DAY*TRT	5	0.01128902	0.00225780	1.25	0.2961
DAY*FAT	2	0.00797563	0.00398782	2.21	0.1181
FAT*TRT	10	0.02129274	0.00212927	1.18	0.3210

Table A-14. ANOVA table for the sensory flavor basic taste sour

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Sour

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	1.22330155	0.02844887	1.41	0.1076
Error	63	1.27492794	0.02023695		
Corrected	Total	106	2.49822949		

R-Square	C.V.	Root MSE	Sour Mean
0.489667	6.474921	0.14225664	2.19704050

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.26688728	0.13344364	6.59	0.0025
TRT	5	0.15735127	0.03147025	1.56	0.1858
DAY	1	0.00512464	0.00512464	0.25	0.6166
FAT	2	0.12095106	0.06047553	2.99	0.0576
REP*TRT	10	0.13639505	0.01363950	0.67	0.7442
REP*DAY	2	0.17258172	0.08629086	4.26	0.0183
REP*FAT	4	0.05044470	0.01261117	0.62	0.6477
DAY*TRT	5	0.07654388	0.01530878	0.76	0.5845
DAY*FAT	2	0.06127514	0.03063757	1.51	0.2279
FAT*TRT	10	0.16642591	0.01664259	0.82	0.6085

Table A-15. ANOVA table for the sensory flavor basic taste bitter

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Bitter

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	3.49928722	0.08137877	1.26	0.1982
Error	63	4.06525588	0.06452787		
Corrected	Total	106	7.56454309		

R-Square	C.V.	Root MSE	Bitter Mean
0.462591	9.797717	0.25402337	2.59267913

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.08591307	0.04295653	0.67	0.5175
TRT	5	1.00840351	0.20168070	3.13	0.0139
DAY	1	0.09702297	0.09702297	1.50	0.2247
FAT	2	0.35469685	0.17734843	2.75	0.0717
REP*TRT	10	0.90964277	0.09096428	1.41	0.1969
REP*DAY	2	0.48404391	0.24202196	3.75	0.0289
REP*FAT	4	0.03478009	0.00869502	0.13	0.9690
DAY*TRT	5	0.11379848	0.02275970	0.35	0.8786
DAY*FAT	2	0.05561343	0.02780671	0.43	0.6518
FAT*TRT	10	0.32929545	0.03292954	0.51	0.8766

Table A-16. ANOVA table for the sensory flavor basic taste sweet

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Sweet

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	2.53309156	0.05890911	1.80	0.0165
Error	63	2.06179941	0.03272697		
Corrected	Total	106	4.59489097		

R-Square	C.V.	Root MSE	Sweet Mean
0.551284	51.32198	0.18090598	0.35249221

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.20133331	0.10066665	3.08	0.0531
TRT	5	0.23934425	0.04786885	1.46	0.2147
DAY	1	0.44443314	0.44443314	13.58	0.0005
FAT	2	0.36053926	0.18026963	5.51	0.0062
REP*TRT	10	0.39261000	0.03926100	1.20	0.3086
REP*DAY	2	0.14066412	0.07033206	2.15	0.1251
REP*FAT	4	0.03332632	0.00833158	0.25	0.9058
DAY*TRT	5	0.20527957	0.04105591	1.25	0.2948
DAY*FAT	2	0.05923034	0.02961517	0.90	0.4098
FAT*TRT	10	0.41805795	0.04180580	1.28	0.2625

Table A-17. ANOVA table for the sensory feeling metallic

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Metallic

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	2.54062903	0.05908440	2.32	0.0011
Error	63	1.60202414	0.02542895		
Corrected	Total	106	4.14265317		

R-Square	C.V.	Root MSE	Metallic Mean
0.613285	6.818266	0.15946459	2.33878505

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.57789169	0.28894584	11.36	0.0001
TRT	5	0.27829558	0.05565912	2.19	0.0665
DAY	1	0.02819512	0.02819512	1.11	0.2964
FAT	2	0.05033277	0.02516638	0.99	0.3774
REP*TRT	10	0.20950197	0.02095020	0.82	0.6072
REP*DAY	2	0.84293798	0.42146899	16.57	0.0001
REP*FAT	4	0.04767811	0.01191953	0.47	0.7584
DAY*TRT	5	0.19076069	0.03815214	1.50	0.2025
DAY*FAT	2	0.02269668	0.01134834	0.45	0.6420
FAT*TRT	10	0.28475181	0.02847518	1.12	0.3620

Table A-18. ANOVA table for the sensory feeling factor astringent

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Astringent

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	3.28696850	0.07644113	1.73	0.0233
Error	63	2.78302111	0.04417494		
Corrected	Total	106	6.06998962		

R-Square	C.V.	Root MSE	Astringent Mean
0.541511	8.352491	0.21017835	2.51635514

Source	DF	Type III SS	Mean Square	F Value	Pr >F
REP	2	1.64265213	0.82132607	18.59	0.0001
TRT	5	0.37744606	0.07548921	1.71	0.1456
DAY	1	0.01891419	0.01891419	0.43	0.5153
FAT	2	0.16427858	0.08213929	1.86	0.1642
REP*TRT	10	0.37793693	0.03779369	0.86	0.5783
REP*DAY	2	0.27898631	0.13949315	3.16	0.0493
REP*FAT	4	0.06691580	0.01672895	0.38	0.8230
DAY*TRT	5	0.03264064	0.00652813	0.15	0.9800
DAY*FAT	2	0.03484021	0.01742011	0.39	0.6758
FAT*TRT	10	0.29040356	0.02904036	0.66	0.7589

Table A-19. ANOVA table for the sensory texture hard

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Hard

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	20.40791310	0.47460263	4.05	0.0001
Error	63	7.38048253	0.11715052		
Corrected	Total	106	27.78839564		

R-Square	C.V.	Root MSE	Hard Mean
0.734404	5.541827	0.34227258	6.17616822

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	6.83808680	3.41904340	29.19	0.0001
TRT	5	4.01484106	0.80296821	6.85	0.0001
DAY	1	4.31333691	4.31333691	36.82	0.0001
FAT	2	2.09435422	1.04717711	8.94	0.0004
REP*TRT	10	1.54850187	0.15485019	1.32	0.2387
REP*DAY	2	0.21001675	0.10500837	0.90	0.4132
REP*FAT	4	0.36958884	0.09239721	0.79	0.5369
DAY*TRT	5	0.31352374	0.06270475	0.54	0.7488
DAY*FAT	2	0.05458430	0.02729215	0.23	0.7929
FAT*TRT	10	0.62675230	0.06267523	0.53	0.8589

Table A-20. ANOVA table for the sensory texture juicy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Juicy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	5.17009684	0.12023481	1.12	0.3334
Error	63	6.74730191	0.10710003		
Corrected	Total	106	11.91739875		

R-Square	C.V.	Root MSE	Juicy Mean
0.433828	11.58671	0.32726141	2.82445483

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	1.13292396	0.56646198	5.29	0.0075
TRT	5	0.36883973	0.07376795	0.69	0.6337
DAY	1	0.26500067	0.26500067	2.47	0.1207
FAT	2	0.86446962	0.43223481	4.04	0.0224
REP*TRT	10	0.62929885	0.06292989	0.59	0.8181
REP*DAY	2	0.05548428	0.02774214	0.26	0.7726
REP*FAT	4	0.20036659	0.05009165	0.47	0.7592
DAY*TRT	5	0.70548090	0.14109618	1.32	0.2682
DAY*FAT	2	0.23665537	0.11832768	1.10	0.3376
FAT*TRT	10	0.75157707	0.07515771	0.70	0.7192

Table A-21. ANOVA table for the sensory texture springy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Springy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	38.67668466	0.89945778	4.10	0.0001
Error	63	13.80518450	0.21912991		
Corrected	Total	106	52.48186916		

R-Square	C.V.	Root MSE	Springy Mean
0.736953	6.361875	0.46811314	7.35809969

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	16.84159658	8.42079829	38.43	0.0001
TRT	5	4.42096258	0.88419252	4.04	0.0031
DAY	1	6.87253665	6.87253665	31.36	0.0001
FAT	2	1.97676505	0.98838252	4.51	0.0148
REP*TRT	10	2.47495314	0.24749531	1.13	0.3552
REP*DAY	2	1.51474987	0.75737494	3.46	0.0376
REP*FAT	4	0.96155626	0.24038907	1.10	0.3659
DAY*TRT	5	1.28882311	0.25776462	1.18	0.3308
DAY*FAT	2	0.33800803	0.16900402	0.77	0.4668
FAT*TRT	10	1.71125871	0.17112587	0.78	0.6466

Table A-22. ANOVA table for the sensory aftertaste serumy

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste serumy

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	3.63135233	0.08445005	3.36	0.0001
Error	63	1.58531953	0.02516380		
Corrected	Total	106	5.21667186		

R-Square	C.V.	Root MSE	Aftertaste serumy Mean
0.696105	46.90977	0.15863103	0.33816199

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.94654713	0.47327356	18.81	0.0001
TRT	5	0.40410452	0.08082090	3.21	0.0120
DAY	1	0.59419887	0.59419887	23.61	0.0001
FAT	2	0.01132512	0.00566256	0.23	0.7991
REP*TRT	10	0.26483938	0.02648394	1.05	0.4118
REP*DAY	2	0.78485474	0.39242737	15.59	0.0001
REP*FAT	4	0.09997697	0.02499424	0.99	0.4179
DAY*TRT	5	0.10566339	0.02113268	0.84	0.5266
DAY*FAT	2	0.01764199	0.00882099	0.35	0.7057
FAT*TRT	10	0.33845435	0.03384543	1.35	0.2270

Table A-23. ANOVA table for the sensory aftertaste browned

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste browned

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	9.74768044	0.22669024	1.45	0.0897
Error	63	9.87263628	0.15670851		
Corrected	Total	106	19.62031672		

R-Square	C.V.	Root MSE	Aftertaste browned Mean
0.496816	36.13605	0.39586426	1.09548287

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	3.20762732	1.60381366	10.23	0.0001
TRT	5	1.58093253	0.31618651	2.02	0.0882
DAY	1	1.18996854	1.18996854	7.59	0.0077
FAT	2	0.07351735	0.03675868	0.23	0.7916
REP*TRT	10	0.87616461	0.08761646	0.56	0.8407
REP*DAY	2	0.92015304	0.46007652	2.94	0.0604
REP*FAT	4	0.43212010	0.10803003	0.69	0.6020
DAY*TRT	5	0.30229637	0.06045927	0.39	0.8567
DAY*FAT	2	0.09277380	0.04638690	0.30	0.7448
FAT*TRT	10	0.93457938	0.09345794	0.60	0.8109

Table A-24. ANOVA table for the sensory aftertaste sorghum

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste sorghum

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	6.64378151	0.15450655	1.74	0.0221
Error	63	5.59127042	0.08875032		
Corrected	Total	106	12.23505192		

R-Square	C.V.	Root MSE	Aftertaste sorghum Mean
0.543012	72.22741	0.29790993	0.41246106

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	1.75109054	0.87554527	9.87	0.0002
TRT	5	1.90418815	0.38083763	4.29	0.0020
DAY	1	0.03066002	0.03066002	0.35	0.5588
FAT	2	0.28068054	0.14034027	1.58	0.2138
REP*TRT	10	0.86489784	0.08648978	0.97	0.4743
REP*DAY	2	0.98575571	0.49287786	5.55	0.0060
REP*FAT	4	0.19039682	0.04759920	0.54	0.7095
DAY*TRT	5	0.16102837	0.03220567	0.36	0.8720
DAY*FAT	2	0.26865379	0.13432689	1.51	0.2280
FAT*TRT	10	0.29735540	0.02973554	0.34	0.9682

Table A-25. ANOVA table for the sensory aftertaste sour

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste sour

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	2.11203390	0.04911707	1.40	0.1113
Error	63	2.21338666	0.03513312		
Corrected	Total	106	4.32542056		

R-Square	C.V.	Root MSE	Aftertaste sour Mean
0.488284	11.09184	0.18743831	1.68987539

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.23473047	0.11736523	3.34	0.0418
TRT	5	0.09679759	0.01935952	0.55	0.7369
DAY	1	0.51086369	0.51086369	14.54	0.0003
FAT	2	0.06575050	0.03287525	0.94	0.3977
REP*TRT	10	0.14590179	0.01459018	0.42	0.9343
REP*DAY	2	0.35298664	0.17649332	5.02	0.0095
REP*FAT	4	0.18322520	0.04580630	1.30	0.2783
DAY*TRT	5	0.05906231	0.01181246	0.34	0.8891
DAY*FAT	2	0.04378735	0.02189368	0.62	0.5395
FAT*TRT	10	0.39186703	0.03918670	1.12	0.3651

Table A-26. ANOVA table for the sensory aftertaste bitter

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste bitter

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	9.77809277	0.22739751	4.55	0.0001
Error	63	3.14688127	0.04995050		
Corrected	Total	106	12.92497404		

R-Square	C.V.	Root MSE	Aftertaste bitter Mean
0.756527	9.550352	0.22349608	2.34018692

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	1.81031289	0.90515645	18.12	0.0001
TRT	5	1.14119442	0.22823888	4.57	0.0013
DAY	1	2.97079347	2.97079347	59.47	0.0001
FAT	2	0.15417934	0.07708967	1.54	0.2216
REP*TRT	10	0.83599035	0.08359904	1.67	0.1070
REP*DAY	2	1.35334320	0.67667160	13.55	0.0001
REP*FAT	4	0.13477632	0.03369408	0.67	0.6121
DAY*TRT	5	0.38896683	0.07779337	1.56	0.1852
DAY*FAT	2	0.01288304	0.00644152	0.13	0.8792
FAT*TRT	10	0.89975745	0.08997575	1.80	0.0786

Table A-27. ANOVA table for the sensory aftertaste sweet

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste sweet

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	1.15551178	0.02687237	1.36	0.1316
Error	63	1.24529819	0.01976664		
Corrected	Total	106	2.40080997		

R-Square	C.V.	Root MSE	Aftertaste sweet Mean
0.481301	93.43817	0.14059388	0.15046729

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.36991022	0.18495511	9.36	0.0003
TRT	5	0.08101518	0.01620304	0.82	0.5402
DAY	1	0.01940290	0.01940290	0.98	0.3256
FAT	2	0.07338478	0.03669239	1.86	0.1647
REP*TRT	10	0.15681892	0.01568189	0.79	0.6352
REP*DAY	2	0.16500188	0.08250094	4.17	0.0199
REP*FAT	4	0.05887165	0.01471791	0.74	0.5653
DAY*TRT	5	0.13117978	0.02623596	1.33	0.2642
DAY*FAT	2	0.02395530	0.01197765	0.61	0.5487
FAT*TRT	10	0.06350978	0.00635098	0.32	0.9726

Table A-28. ANOVA table for the sensory aftertaste metallic

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste metallic

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	2.48874896	0.05787788	1.45	0.0868
Error	63	2.50797482	0.03980912		
Corrected	Total	106	4.99672378		

R-Square	C.V.	Root MSE	Aftertaste metallic Mean
0.498076	8.780127	0.19952224	2.27242991

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.35658311	0.17829155	4.48	0.0152
TRT	5	0.33172567	0.06634513	1.67	0.1558
DAY	1	0.09870313	0.09870313	2.48	0.1204
FAT	2	0.05260455	0.02630227	0.66	0.5200
REP*TRT	10	0.26991474	0.02699147	0.68	0.7406
REP*DAY	2	0.48001137	0.24000569	6.03	0.0040
REP*FAT	4	0.07956024	0.01989006	0.50	0.7361
DAY*TRT	5	0.23428293	0.04685659	1.18	0.3305
DAY*FAT	2	0.00041506	0.00020753	0.01	0.9948
FAT*TRT	10	0.61695355	0.06169535	1.55	0.1431

Table A-29. ANOVA table for the sensory aftertaste astringent

General Linear Models Procedure

Class	Levels	Values
REP	3	1 2 3
TRT	6	B C H L M R
DAY	2	1 5
FAT	3	10 20 30

Number of observations in data set = 107

Dependent Variable: Aftertaste astringent

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	43	3.13110090	0.07281630	0.97	0.5410
Error	63	4.74569557	0.07532850		
Corrected	Total	106	7.87679647		

R-Square	C.V.	Root MSE	Aftertaste astringent Mean
0.397509	12.14862	0.27446038	2.25919003

Source	DF	Type III SS	Mean Square	F Value	Pr > F
REP	2	0.40099947	0.20049973	2.66	0.0777
TRT	5	0.48742895	0.09748579	1.29	0.2778
DAY	1	0.28531844	0.28531844	3.79	0.0561
FAT	2	0.05168082	0.02584041	0.34	0.7109
REP*TRT	10	0.50072835	0.05007284	0.66	0.7524
REP*DAY	2	0.17803650	0.08901825	1.18	0.3135
REP*FAT	4	0.31635372	0.07908843	1.05	0.3888
DAY*TRT	5	0.39152449	0.07830490	1.04	0.4024
DAY*FAT	2	0.03615893	0.01807947	0.24	0.7873
FAT*TRT	10	0.52254934	0.05225493	0.69	0.7265

APPENDIX B

RAW DATA

FAME

Fat	Rep	Myristic	Palmitic	Palmitoleic	Stearic	Trans-Vaccinic	Vaccinic	Oleic	Linoleic
10	1	4.74	29.74	2.95	16.30	6.78	1.09	32.19	3.77
10	2	2.83	26.25	2.27	20.72	3.32	1.10	33.30	1.89
10	3	2.58	25.50	2.41	20.22	4.41	1.12	33.35	2.98
20	1	4.42	28.37	2.69	18.26	5.69	0.99	32.62	3.32
20	2	2.78	23.33	2.20	19.43	7.29	1.16	33.45	3.37
20	3	3.41	24.14	2.94	14.75	8.91	1.40	32.70	2.23
30	1	3.25	23.87	1.93	20.00	7.37	1.03	31.73	3.81
30	2	3.63	24.55	2.80	16.10	8.61	1.31	31.94	2.55
30	3	3.38	23.47	2.13	17.51	9.44	1.21	32.52	3.44

EXUDATE

Date	C3D	Rep	Day	Trt	Fat	PurgeTotalWt	PurgeWt.Patty	PurgeWt.Pack
4/9/05	281	1	0	C	10	0	0	0
4/9/05	846	1	0	B	10	0	0	0
4/9/05	422	1	0	R	10	0	0	0
4/9/05	119	1	0	L	10	0	0	0
4/9/05	463	1	0	M	10	0	0	0
4/9/05	12	1	0	H	10	0	0	0
4/9/05	253	1	0	C	20	0	0	0
4/9/05	111	1	0	B	20	0	0	0
4/9/05	778	1	0	R	20	0	0	0
4/9/05	798	1	0	L	20	0	0	0
4/9/05	190	1	0	M	20	0	0	0
4/9/05	593	1	0	H	20	0	0	0
4/9/05	155	1	0	C	30	0	0	0
4/9/05	777	1	0	B	30	0	0	0
4/9/05	434	1	0	R	30	0	0	0
4/9/05	591	1	0	L	30	0	0	0
4/9/05	674	1	0	M	30	0	0	0
4/9/05	52	1	0	H	30	0	0	0
4/10/05	345	1	1	C	10	416.83	397.88	18.62
4/10/05	830	1	1	B	10	414076	395.15	19.21
4/10/05	514	1	1	R	10	416.75	397.57	18.81
4/10/05	652	1	1	L	10	417.29	397.64	19.33
4/10/05	891	1	1	M	10	416.52	397.12	19.07
4/10/05	822	1	1	H	10	415.62	396.05	19.23
4/10/05	923	1	1	C	20	417.98	399.46	18.25
4/10/05	483	1	1	B	20	417.08	398.58	18.26
4/10/05	230	1	1	R	20	415.98	397.6	18.17
4/10/05	485	1	1	M	20	417.58	398.31	18.89
4/10/05	789	1	1	H	20	418.53	398.87	19.48
4/10/05	722	1	1	C	30	417.96	399.27	18.51
4/10/05	264	1	1	B	30	416.91	97.13	19.53
4/10/05	92	1	1	R	30	417.21	397.13	19.85
4/10/05	177	1	1	L	30	415.99	396.42	19.4
4/10/05	600	1	1	M	30	416.84	397.37	19.28
4/10/05	488	1	1	H	30	416.73	398.12	19.48
4/12/05	879	1	3	C	10	0	0	0
4/12/05	321	1	3	B	10	0	0	0

4/12/05	297	1	3	R	10	0	0	0
4/12/05	781	1	3	L	10	0	0	0
4/12/05	821	1	3	M	10	0	0	0
4/12/05	793	1	3	H	10	0	0	0
4/12/05	54	1	3	C	20	0	0	0
4/12/05	930	1	3	B	20	0	0	0
4/12/05	767	1	3	R	20	0	0	0
4/12/05	215	1	3	L	20	0	0	0
4/12/05	605	1	3	M	20	0	0	0
4/12/05	800	1	3	H	20	0	0	0
4/12/05	794	1	3	C	30	0	0	0
4/12/05	549	1	3	B	30	0	0	0
4/12/05	526	1	3	R	30	0	0	0
4/12/05	649	1	3	L	30	0	0	0
4/12/05	1	1	3	M	30	0	0	0
4/12/05	261	1	3	H	30	0	0	0
4/14/05	318	1	5	C	10	412.31	393.75	18.19
4/14/05	710	1	5	B	10	410.03	391.09	18.69
4/14/05	728	1	5	R	10	412.09	393.85	18.42
4/14/05	455	1	5	L	10	410.73	391.6	18.86
4/14/05	731	1	5	M	10	411.15	391.99	18.71
4/14/05	115	1	5	H	10	410.65	389.76	18.61
4/14/05	992	1	5	C	20	413.53	395.81	17.76
4/14/05	425	1	5	B	20	419.96	394.36	19.13
4/14/05	945	1	5	R	20	413.72	395.22	18.52
4/14/05	196	1	5	L	20	414.60	395.48	18.77
4/14/05	17	1	5	M	20	411.03	393.54	17.04
4/14/05	543	1	5	H	20	415.10	396.19	18.52
4/14/05	703	1	5	C	30	413.24	395.16	18.62
4/14/05	557	1	5	B	30	413.97	394.31	19.34
4/14/05	535	1	5	R	30	412.42	393.51	19.28
4/14/05	757	1	5	L	30	413.69	393.44	19.94
4/14/05	990	1	5	M	30	412.40	393.58	16.33
4/14/05	438	1	5	H	30	413.53	394.27	18.89
4/16/05	7	2	0	C	10	0	0	0
4/16/05	501	2	0	B	10	0	0	0
4/16/05	717	2	0	R	10	0	0	0
4/16/05	733	2	0	L	10	0	0	0
4/16/05	260	2	0	M	10	0	0	0
4/16/05	959	2	0	H	10	0	0	0
4/16/05	636	2	0	C	20	0	0	0
4/16/05	500	2	0	R	20	0	0	0
4/16/05	487	2	0	L	20	0	0	0
4/16/05	951	2	0	M	20	0	0	0
4/16/05	195	2	0	H	20	0	0	0
4/16/05	430	2	0	C	30	0	0	0
4/16/05	284	2	0	B	30	0	0	0
4/16/05	212	2	0	R	30	0	0	0
4/16/05	362	2	0	L	30	0	0	0
4/16/05	625	2	0	M	30	0	0	0
4/16/05	825	2	0	H	30	0	0	0
4/17/05	493	2	1	C	10	415.42	397.46	17.67
4/17/05	81	2	1	B	10	417.17	397.06	18.28
4/17/05	925	2	1	R	10	417.04	397.97	18.72
4/17/05	99	2	1	L	10	414.54	39.64	18.52
4/17/05	507	2	1	M	10	417.76	398.72	18.74
4/17/05	144	2	1	H	10	416.92	398.18	18.48
4/17/05	327	2	1	C	20	416.68	398.84	17.86
4/17/05	856	2	1	B	20	417.44	398.7	18.32

4/17/05	89	2	1	R	20	417.50	399.17	18.07
4/17/05	523	2	1	L	20	417.84	398.48	17.94
4/17/05	596	2	1	M	20	418.87	399.63	18.95
4/17/05	293	2	1	H	20	417.84	397.46	18.73
4/17/05	675	2	1	C	30	418.59	399.83	18.71
4/17/05	898	2	1	B	30	418.13	398.88	18.62
4/17/05	637	2	1	R	30	416.11	398.08	17.87
4/17/05	361	2	1	L	30	417.27	399.3	18.12
4/17/05	989	2	1	M	30	416.83	397.42	19.16
4/17/05	0	2	1	H	30	417.88	398.09	19.52
4/19/05	171	2	3	C	10	0	0	0
4/19/05	225	2	3	B	10	0	0	0
4/19/05	544	2	3	R	10	0	0	0
4/19/05	958	2	3	L	10	0	0	0
4/19/05	899	2	3	M	10	0	0	0
4/19/05	10	2	3	H	10	0	0	0
4/19/05	738	2	3	C	20	0	0	0
4/19/05	22	2	3	B	20	0	0	0
4/19/05	385	2	3	R	20	0	0	0
4/19/05	354	2	3	L	20	0	0	0
4/19/05	203	2	3	M	20	0	0	0
4/19/05	770	2	3	H	20	0	0	0
4/19/05	87	2	3	C	30	0	0	0
4/19/05	252	2	3	B	30	0	0	0
4/19/05	315	2	3	R	30	0	0	0
4/19/05	407	2	3	L	30	0	0	0
4/19/05	397	2	3	M	30	0	0	0
4/19/05	704	2	3	H	30	0	0	0
4/21/05	656	2	5	C	10	413.21	394.26	18.42
4/21/05	734	2	5	B	10	415.00	395.12	19.22
4/21/05	349	2	5	R	10	414.85	395.79	18.46
4/21/05	433	2	5	L	10	412.38	393.59	18.09
4/21/05	153	2	5	H	10	409.56	390.89	18.05
4/21/05	515	2	5	C	20	412.05	393.9	17.75
4/21/05	909	2	5	B	20	410.86	392.42	18.05
4/21/05	23	2	5	R	20	413.68	394.6	18.59
4/21/05	409	2	5	L	20	412.81	394.55	17.8
4/21/05	14	2	5	M	20	414.03	395.26	18.46
4/21/05	831	2	5	H	20	412.20	393.49	18.26
4/21/05	938	2	5	C	30	413.21	394.41	18.49
4/21/05	302	2	5	B	30	413.34	394.57	18.46
4/21/05	582	2	5	R	30	411.88	394.24	17.37
4/21/05	427	2	5	L	30	413.36	394.49	18.41
4/21/05	998	2	5	M	30	413.92	394.99	18.64
4/21/05	646	2	5	H	30	413.23	394.13	18.78
4/23/05	709	3	0	C	10	0	0	0
4/23/05	73	3	0	B	10	0	0	0
4/23/05	976	3	0	R	10	0	0	0
4/23/05	653	3	0	L	10	0	0	0
4/23/05	570	3	0	M	10	0	0	0
4/23/05	256	3	0	H	10	0	0	0
4/23/05	288	3	0	C	20	0	0	0
4/23/05	880	3	0	B	20	0	0	0
4/23/05	209	3	0	R	20	0	0	0
4/23/05	538	3	0	L	20	0	0	0
4/23/05	808	3	0	M	20	0	0	0
4/23/05	737	3	0	H	20	0	0	0
4/23/05	587	3	0	C	30	0	0	0
4/23/05	750	3	0	B	30	0	0	0

4/23/05	37	3	0	R	30	0	0	0
4/23/05	917	3	0	L	30	0	0	0
4/23/05	400	3	0	M	30	0	0	0
4/23/05	610	3	0	H	30	0	0	0
4/24/05	612	3	1	C	10	418.48	399.23	18.7
4/24/05	45	3	1	B	10	420.64	400.84	19.52
4/24/05	420	3	1	R	10	420.25	400.09	19.88
4/24/05	444	3	1	L	10	418.50	399.52	18.79
4/24/05	287	3	1	M	10	418.75	398.8	19.69
4/24/05	331	3	1	H	10	419.63	399.31	19.59
4/24/05	619	3	1	C	20	418.75	398.84	19.7
4/24/05	337	3	1	B	20	419.21	398.91	19.69
4/24/05	162	3	1	R	20	418.35	399.03	18.97
4/24/05	819	3	1	L	20	418.80	397.84	19.41
4/24/05	266	3	1	M	20	419.08	399.62	19.29
4/24/05	147	3	1	H	20	417.24	398.3	18.8
4/24/05	189	3	1	C	30	418.26	400.01	18.23
4/24/05	785	3	1	B	30	417.32	394.17	18.94
4/24/05	629	3	1	R	30	418.41	399.94	18.59
4/24/05	764	3	1	L	30	418.18	399.14	18.65
4/24/05	865	3	1	M	30	418.08	399.2	18.61
4/24/05	701	3	1	H	30	418.65	399.54	18.89
4/26/05	980	3	3	C	10	0	0	0
4/26/05	60	3	3	B	10	0	0	0
4/26/05	581	3	3	L	10	0	0	0
4/26/05	519	3	3	M	10	0	0	0
4/26/05	356	3	3	H	10	0	0	0
4/26/05	885	3	3	C	20	0	0	0
4/26/05	221	3	3	B	20	0	0	0
4/26/05	664	3	3	R	20	0	0	0
4/26/05	545	3	3	L	20	0	0	0
4/26/05	81	3	3	M	20	0	0	0
4/26/05	187	3	3	H	20	0	0	0
4/26/05	68	3	3	C	30	0	0	0
4/26/05	572	3	3	B	30	0	0	0
4/26/05	11	3	3	R	30	0	0	0
4/26/05	994	3	3	L	30	0	0	0
4/26/05	44	3	3	M	30	0	0	0
4/26/05	689	3	3	H	30	0	0	0
4/28/05	199	3	5	C	10	414.10	395.13	18.46
4/28/05	219	3	5	B	10	417.26	396.37	20.2
4/28/05	474	3	5	R	10	415.00	394.7	19.7
4/28/05	151	3	5	L	10	414.73	395.2	18.76
4/28/05	428	3	5	M	10	416.46	396.54	19.27
4/28/05	588	3	5	H	10	416.87	395.92	20.14
4/28/05	192	3	5	C	20	416.00	395.8	19.67
4/28/05	182	3	5	B	20	415.53	395.88	19.36
4/28/05	577	3	5	R	20	415.13	395.54	19.06
4/28/05	874	3	5	L	20	416.00	395.27	19.53
4/28/05	902	3	5	M	20	417.47	397.7	19.2
4/28/05	217	3	5	H	20	415.57	395.81	19.09
4/28/05	496	3	5	C	30	415.41	395.48	18.6
4/28/05	780	3	5	B	30	416.04	396.55	18.77
4/28/05	685	3	5	R	30	414.34	395.28	18.7
4/28/05	966	3	5	L	30	416.22	396.42	19.31
4/28/05	235	3	5	M	30	414.19	394.5	18.41
4/28/05	705	3	5	H	30	415.10	394.45	19.96

TBARS, pH

Date	C3D	Rep	Day	Trt	Fat	TBAR1-1	TBAR1-2	TBAR2-1	TBAR2-2	pH1	pH2	pH3
4/9/05	281	1	0	C	10	0.023	0.022	0.038	0.033	0	5.92	5.93
4/9/05	846	1	0	B	10	0.043	0.048	0.04	0.037	0	5.98	5.97
4/9/05	422	1	0	R	10	0.028	0.031	0.031	0.028	0	6	6.3
4/9/05	119	1	0	L	10	0.024	0.025	0.024	0.022	0	5.96	5.99
4/9/05	463	1	0	M	10	0.023	0.024	0.029	0.029	0	6.09	6.03
4/9/05	12	1	0	H	10	0.03	0.031	0.022	0.025	0	6.07	6.05
4/9/05	253	1	0	C	20	0.029	0.027	0.03	0.029	0	6.8	6.9
4/9/05	111	1	0	B	20	0.038	0.039	0.026	0.024	0	6.08	6.08
4/9/05	778	1	0	R	20	0.039	0.04	0.034	0.03	0	6.09	6.1
4/9/05	798	1	0	L	20	0.032	0.035	0.037	0.036	0	6.06	6.11
4/9/05	190	1	0	M	20	0.035	0.029	0.022	0.021	0	6.17	6.17
4/9/05	593	1	0	H	20	0.04	0.04	0.031	0.027	0	6.18	6.18
4/9/05	155	1	0	C	30	0.031	0.029	0.031	0.032	0	6.12	6.11
4/9/05	777	1	0	B	30	0.027	0.028	0.027	0.025	0	6.13	6.2
4/9/05	434	1	0	R	30	0.037	0.037	0.03	0.029	0	6.18	6.13
4/9/05	591	1	0	L	30	0.038	0.039	0.036	0.037	0	5.9	5.89
4/9/05	674	1	0	M	30	0.043	0.042	0.032	0.032	0	6.16	6.19
4/9/05	52	1	0	H	30	0.024	0.025	0.034	0.036	0	6.17	6.13
4/10/05	345	1	1	C	10	0.046	0.038	0.037	0.036	5.95	5.98	5.99
4/10/05	830	1	1	B	10	0.031	0.03	0.023	0.023	6.01	6.08	6.09
4/10/05	514	1	1	R	10	0.044	0.039	0.041	0.041	6.06	6.07	6.08
4/10/05	652	1	1	L	10	0.029	0.028	0.025	0.025	6.04	6.09	6.08
4/10/05	891	1	1	M	10	0.03	0.029	0.028	0.028	6.03	6.09	6.12
4/10/05	822	1	1	H	10	0.043	0.043	0.048	0.039	6.1	6.12	6.13
4/10/05	923	1	1	C	20	0.032	0.032	0.034	0.034	6.03	6.03	6.1
4/10/05	483	1	1	B	20	0.04	0.04	0.029	0.029	6.02	6.05	6.05
4/10/05	230	1	1	R	20	0.029	0.028	0.027	0.027	6.05	6.08	6.06
4/10/05	75	1	1	L	20	0.023	0.023	0.029	0.028	6.02	6.03	6.09
4/10/05	485	1	1	M	20	0.035	0.028	0.024	0.025	6.06	6.07	6.11
4/10/05	789	1	1	H	20	0.03	0.029	0.024	0.024	6.08	6.16	6.13
4/10/05	722	1	1	C	30	0.043	0.04	0.041	0.042	6.04	6.02	6.05
4/10/05	264	1	1	B	30	0.046	0.044	0.042	0.043	6.03	6.04	6.04
4/10/05	92	1	1	R	30	0.04	0.04	0.067	0.043	6.04	6.04	6.08
4/10/05	177	1	1	L	30	0.038	0.037	0.039	0.037	6.08	6.09	6.09
4/10/05	600	1	1	M	30	0.04	0.039	0.039	0.037	6.07	6.07	6.13
4/10/05	488	1	1	H	30	0.049	0.045	0.026	0.026	6.12	6.09	6.12
4/12/05	879	1	3	C	10	0.026	0.026	0.024	0.025	6.13	6.14	6.18
4/12/05	321	1	3	B	10	0.016	0.017	0.014	0.014	6.33	6.25	6.24

4/12/05	297	1	3	R	10	0.024	0.022	0.013	0.013	6.33	6.26	6.22
4/12/05	781	1	3	L	10	0.015	0.016	0.018	0.016	6.32	6.25	6.23
4/12/05	821	1	3	M	10	0.014	0.016	0.021	0.02	6.35	6.28	6.26
4/12/05	793	1	3	H	10	0.018	0.018	0.028	0.028	6.34	6.3	6.28
4/12/05	54	1	3	C	20	0.023	0.022	0.023	0.024	6.33	6.26	6.24
4/12/05	930	1	3	B	20	0.02	0.022	0.02	0.021	6.32	6.28	6.26
4/12/05	767	1	3	R	20	0.015	0.014	0.018	0.018	6.36	6.34	6.31
4/12/05	215	1	3	L	20	0.022	0.021	0.019	0.018	6.38	6.32	6.29
4/12/05	605	1	3	M	20	0.018	0.016	0.018	0.02	6.28	6.29	6.26
4/12/05	800	1	3	H	20	0.022	0.028	0.018	0.018	6.33	6.33	6.3
4/12/05	794	1	3	C	30	0.034	0.034	0.032	0.033	6.3	6.26	6.25
4/12/05	549	1	3	B	30	0.024	0.026	0.022	0.021	6.24	6.24	6.24
4/12/05	526	1	3	R	30	0.021	0.021	0.022	0.023	6.31	6.3	6.26
4/12/05	649	1	3	L	30	0.021	0.023	0.023	0.023	6.24	6.25	6.27
4/12/05	1	1	3	M	30	0.024	0.024	0.021	0.021	6.35	6.32	6.31
4/12/05	261	1	3	H	30	0.022	0.021	0.021	0.025	6.28	6.27	6.23
4/14/05	318	1	5	C	10	0.047	0.049	0.055	0.056	6.34	6.3	6.31
4/14/05	710	1	5	B	10	0.042	0.037	0.036	0.04	6.27	6.31	6.28
4/14/05	728	1	5	R	10	0.039	0.039	0.022	0.021	6.36	6.32	6.29
4/14/05	455	1	5	L	10	0.023	0.021	0.021	0.021	6.46	6.43	6.39
4/14/05	731	1	5	M	10	0.021	0.021	0.026	0.025	6.54	6.36	6.35
4/14/05	115	1	5	H	10	0.025	0.025	0.035	0.035	6.53	6.51	6.46
4/14/05	992	1	5	C	20	0.053	0.051	0.041	0.042	6.47	6.45	6.45
4/14/05	425	1	5	B	20	0.055	0.054	0.07	0.067	6.56	6.56	6.42
4/14/05	945	1	5	R	20	0.047	0.049	0.06	0.061	6.53	6.56	6.44
4/14/05	196	1	5	L	20	0.039	0.041	0.04	0.04	6.51	6.44	6.41
4/14/05	17	1	5	M	20	0.048	0.048	0.076	0.076	6.4	6.38	6.38
4/14/05	543	1	5	H	20	0.042	0.041	0.043	0.042	6.53	6.52	6.48
4/14/05	703	1	5	C	30	0.079	0.092	0.057	0.054	6.43	6.39	6.35
4/14/05	557	1	5	B	30	0.052	0.053	0.029	0.031	6.38	6.33	6.32
4/14/05	535	1	5	R	30	0.065	0.063	0.064	0.074	6.39	6.35	6.33
4/14/05	757	1	5	L	30	0.057	0.054	0.04	0.043	6.42	6.38	6.35
4/14/05	990	1	5	M	30	0.045	0.045	0.04	0.042	6.46	6.43	6.38
4/14/05	438	1	5	H	30	0.076	0.076	0.043	0.042	6.35	6.34	6.29
4/16/05	7	2	0	C	10	0.097	0.098	0.068	0.071	6.42	6.34	6.33
4/16/05	501	2	0	B	10	0.038	0.039	0.036	0.039	6.33	6.33	6.3
4/16/05	717	2	0	R	10	0.054	0.052	0.059	0.068	6.51	6.44	6.38
4/16/05	733	2	0	L	10	0.088	0.073	0.065	0.053	6.55	6.59	6.44
4/16/05	260	2	0	M	10	0.04	0.027	0.037	0.053	6.49	6.52	6.5
4/16/05	959	2	0	H	10	0.054	0.059	0.041	0.043	6.54	6.52	6.53
4/16/05	636	2	0	C	20	0.054	0.049	0.082	0.066	6.51	6.61	6.51

4/16/05	978	2	0	B	20	0.039	0.038	0.034	0.039	6.57	6.55	6.55
4/16/05	500	2	0	R	20	0.029	0.031	0.021	0.025	6.42	6.49	6.51
4/16/05	487	2	0	L	20	0.023	0.038	0.024	0.031	6.56	6.51	6.57
4/16/05	951	2	0	M	20	0.045	0.047	0.048	0.032	6.53	6.6	6.56
4/16/05	195	2	0	H	20	0.025	0.025	0.021	0.035	6.52	6.57	6.59
4/16/05	430	2	0	C	30	0.067	0.065	0.053	0.062	6.6	6.61	6.61
4/16/05	284	2	0	B	30	0.049	0.041	0.041	0.044	6.27	6.45	6.44
4/16/05	212	2	0	R	30	0.031	0.033	0.041	0.041	6.66	6.53	6.54
4/16/05	362	2	0	L	30	0.061	0.059	0.068	0.065	6.58	6.55	6.57
4/16/05	625	2	0	M	30	0.052	0.031	0.038	0.056	6.62	6.58	6.56
4/16/05	825	2	0	H	30	0.042	0.041	0.051	0.051	6.58	6.56	6.61
4/17/05	493	2	1	C	10	0.156	0.161	0.164	0.164	6.3	6.26	6.27
4/17/05	81	2	1	B	10	0.043	0.047	0.06	0.06	6.46	6.38	6.35
4/17/05	925	2	1	R	10	0.061	0.063	0.073	0.073	6.42	6.29	6.29
4/17/05	99	2	1	L	10	0.109	0.108	0.099	0.101	6.42	6.39	6.36
4/17/05	507	2	1	M	10	0.065	0.067	0.074	0.073	6.52	6.45	6.4
4/17/05	144	2	1	H	10	0.073	0.081	0.051	0.061	6.53	6.52	6.53
4/17/05	327	2	1	C	20	0.08	0.08	0.105	0.079	6.63	6.55	6.52
4/17/05	856	2	1	B	20	0.048	0.05	0.05	0.058	6.6	6.53	6.54
4/17/05	89	2	1	R	20	0.044	0.052	0.039	0.044	6.56	6.48	6.39
4/17/05	523	2	1	L	20	0.037	0.03	0.036	0.044	6.51	6.48	6.45
4/17/05	596	2	1	M	20	0.044	0.053	0.046	0.05	6.52	6.5	6.46
4/17/05	293	2	1	H	20	0.04	0.045	0.04	0.063	6.55	6.55	6.51
4/17/05	675	2	1	C	30	0.131	0.13	0.112	0.11	6.45	6.42	6.42
4/17/05	898	2	1	B	30	0.104	0.107	0.077	0.081	6.51	6.49	6.45
4/17/05	637	2	1	R	30	0.065	0.068	0.053	0.068	6.48	6.47	6.45
4/17/05	361	2	1	L	30	0.071	0.072	0.062	0.064	6.54	6.47	6.46
4/17/05	989	2	1	M	30	0.061	0.063	0.049	0.053	6.52	6.49	6.48
4/17/05	0	2	1	H	30	0.049	0.055	0.056	0.063	6.52	6.54	6.49
4/19/05	171	2	3	C	10	0.269	0.268	0.263	0.265	6.54	6.59	6.39
4/19/05	225	2	3	B	10	0.047	0.047	0.055	0.059	6.38	6.31	6.25
4/19/05	544	2	3	R	10	0.141	0.083	0.07	0.067	6.28	6.3	6.34
4/19/05	958	2	3	L	10	0.136	0.139	0.125	0.128	6.37	6.41	6.38
4/19/05	899	2	3	M	10	0.061	0.066	0.072	0.073	6.45	6.45	6.44
4/19/05	10	2	3	H	10	0.056	0.054	0.055	0.06	6.48	6.47	6.46
4/19/05	738	2	3	C	20	0.123	0.124	0.14	0.15	6.43	6.41	6.4
4/19/05	22	2	3	B	20	0.049	0.05	0.042	0.052	6.42	6.41	6.43
4/19/05	385	2	3	R	20	0.054	0.053	0.05	0.051	6.44	6.44	6.45
4/19/05	354	2	3	L	20	0.057	0.061	0.051	0.054	6.42	6.43	6.45
4/19/05	203	2	3	M	20	0.053	0.06	0.051	0.051	6.49	6.47	6.38
4/19/05	770	2	3	H	20	0.068	0.071	0.051	0.054	6.52	6.5	6.48

4/19/05	87	2	3	C	30	0.152	0.144	0.144	0.144	6.53	6.47	6.39
4/19/05	252	2	3	B	30	0.092	0.084	0.087	0.088	6.47	6.47	6.47
4/19/05	315	2	3	R	30	0.054	0.057	0.064	0.069	6.51	6.44	6.41
4/19/05	407	2	3	L	30	0.013	0.018	0.014	0.024	6.53	6.52	6.53
4/19/05	397	2	3	M	30	0.017	0.024	0.012	0.021	6.57	6.55	6.48
4/19/05	704	2	3	H	30	0.07	0.08	0.069	0.071	6.62	6.61	6.58
4/21/05	656	2	5	C	10	0.506	0.509	0.44	0.45	6.27	6.28	6.28
4/21/05	734	2	5	B	10	0.042	0.048	0.05	0.055	6.45	6.38	6.35
4/21/05	349	2	5	R	10	0.076	0.085	0.081	0.079	6.47	6.47	6.54
4/21/05	433	2	5	L	10	0.14	0.155	0.139	0.144	6.65	6.64	6.67
4/21/05	617	2	5	M	10	0.07	0.072	0.082	0.083	6.59	6.66	6.62
4/21/05	153	2	5	H	10	0.074	0.068	0.056	0.058	6.72	6.71	6.68
4/21/05	515	2	5	C	20	0.145	0.149	0.118	0.12	6.62	6.56	6.44
4/21/05	909	2	5	B	20	0.042	0.044	0.049	0.059	6.7	6.62	6.47
4/21/05	23	2	5	R	20	0.034	0.037	0.043	0.045	6.61	6.59	6.5
4/21/05	409	2	5	L	20	0.051	0.065	0.048	0.045	6.68	6.63	6.65
4/21/05	14	2	5	M	20	0.05	0.057	0.042	0.052	6.65	6.72	6.59
4/21/05	831	2	5	H	20	0.043	0.053	0.044	0.049	6.69	6.69	6.63
4/21/05	938	2	5	C	30	0.18	0.181	0.18	0.183	6.64	6.65	6.61
4/21/05	302	2	5	B	30	0.066	0.075	0.069	0.072	6.61	6.62	6.54
4/21/05	582	2	5	R	30	0.078	0.085	0.075	0.075	6.58	6.56	6.55
4/21/05	427	2	5	L	30	0.068	0.071	0.074	0.076	6.63	6.54	6.48
4/21/05	998	2	5	M	30	0.027	0.036	0.072	0.076	6.64	6.6	6.6
4/21/05	646	2	5	H	30	0.053	0.054	0.058	0.06	6.67	6.7	6.68
4/23/05	709	3	0	C	10	0.017	0.028	0.028	0.037	6.21	6.09	5.96
4/23/05	73	3	0	B	10	0.016	0.018	0.022	0.025	5.53	5.72	5.79
4/23/05	976	3	0	R	10	0.017	0.02	0.02	0.015	6.08	6.05	5.74
4/23/05	653	3	0	L	10	0.02	0.022	0.019	0.026	5.75	5.84	5.86
4/23/05	570	3	0	M	10	0.034	0.04	0.021	0.029	5.98	5.98	5.97
4/23/05	256	3	0	H	10	0.019	0.028	0.027	0.036	6.32	6.12	6.07
4/23/05	288	3	0	C	20	0.021	0.037	0.018	0.018	6.12	6	6.04
4/23/05	880	3	0	B	20	0.023	0.028	0.018	0.024	6.03	6.05	5.95
4/23/05	209	3	0	R	20	0.015	0.02	0.027	0.032	6.08	6.14	6.13
4/23/05	538	3	0	L	20	0.022	0.03	0.019	0.024	6.01	6.06	6.1
4/23/05	808	3	0	M	20	0.028	0.043	0.026	0.037	6.14	6.12	6.12
4/23/05	737	3	0	H	20	0.021	0.021	0.022	0.029	6.13	6.13	6.1
4/23/05	587	3	0	C	30	0.031	0.032	0.034	0.036	6.04	6.11	6.03
4/23/05	750	3	0	B	30	0.031	0.032	0.033	0.034	6.19	6.11	6.05
4/23/05	37	3	0	R	30	0.033	0.041	0.027	0.029	6.12	6.16	6.1
4/23/05	917	3	0	L	30	0.03	0.034	0.025	0.029	6.11	6.09	6.69
4/23/05	400	3	0	M	30	0.034	0.037	0.033	0.038	5.95	6.07	6.01

4/23/05	610	3	0	H	30	0.025	0.034	0.031	0.032	6.71	6.42	6.29
4/24/05	612	3	1	C	10	0.022	0.02	0.016	0.017	6.92	6.84	6.69
4/24/05	45	3	1	B	10	0.016	0.016	0.016	0.016	6.82	6.76	6.7
4/24/05	420	3	1	R	10	0.026	0.028	0.016	0.018	6.84	6.77	6.77
4/24/05	444	3	1	L	10	0.019	0.021	0.013	0.018	6.88	6.86	6.84
4/24/05	287	3	1	M	10	0.018	0.02	0.023	0.024	6.89	6.84	6.79
4/24/05	331	3	1	H	10	0.017	0.02	0.016	0.021	6.84	6.84	6.87
4/24/05	619	3	1	C	20	0.024	0.026	0.025	0.028	6.96	6.86	6.88
4/24/05	337	3	1	B	20	0.034	0.036	0.033	0.037	6.95	6.92	6.86
4/24/05	162	3	1	R	20	0.026	0.032	0.041	0.037	6.97	6.95	6.89
4/24/05	819	3	1	L	20	0.024	0.026	0.029	0.026	6.95	6.93	6.85
4/24/05	266	3	1	M	20	0.026	0.025	0.03	0.03	6.94	6.92	6.88
4/24/05	147	3	1	H	20	0.028	0.032	0.019	0.023	6.98	6.96	6.95
4/24/05	189	3	1	C	30	0.037	0.045	0.038	0.035	7	6.92	6.82
4/24/05	785	3	1	B	30	0.039	0.039	0.029	0.034	6.9	6.88	6.86
4/24/05	629	3	1	R	30	0.028	0.029	0.037	0.042	6.93	6.89	6.91
4/24/05	764	3	1	L	30	0.02	0.021	0.03	0.04	6.94	6.95	6.94
4/24/05	865	3	1	M	30	0.023	0.025	0.032	0.032	6.97	6.93	6.83
4/24/05	701	3	1	H	30	0.022	0.024	0.018	0.02	6.96	6.94	6.96
4/26/05	980	3	3	C	10	0.035	0.04	0.029	0.039	5.72	5.83	5.84
4/26/05	60	3	3	B	10	0.03	0.037	0.016	0.023	6.2	6.11	6.1
4/26/05	426	3	3	R	10	0.022	0.031	0.026	0.036	6.07	6.11	6.04
4/26/05	581	3	3	L	10	0.028	0.029	0.026	0.032	6.17	6.08	6.07
4/26/05	519	3	3	M	10	0.014	0.032	0.028	0.029	6.13	6.05	6.03
4/26/05	356	3	3	H	10	0.03	0.03	0.028	0.028	6.08	6.13	6.11
4/26/05	885	3	3	C	20	0.038	0.042	0.032	0.033	6.1	6.12	6.08
4/26/05	221	3	3	B	20	0.032	0.036	0.028	0.029	6.05	6.06	6.04
4/26/05	664	3	3	R	20	0.031	0.034	0.017	0.022	6.03	6.04	6.04
4/26/05	545	3	3	L	20	0.036	0.034	0.032	0.042	6.1	6.07	6.08
4/26/05	81	3	3	M	20	0.021	0.025	0.029	0.031	6.08	6.09	6.09
4/26/05	187	3	3	H	20	0.021	0.025	0.029	0.031	6.05	6.09	6.07
4/26/05	68	3	3	C	30	0.039	0.042	0.042	0.038	6.08	6.04	6.03
4/26/05	572	3	3	B	30	0.022	0.016	0.015	0.014	5.71	5.85	5.86
4/26/05	11	3	3	R	30	0.038	0.041	0.031	0.035	6.04	6.03	6.02
4/26/05	994	3	3	L	30	0.022	0.026	0.035	0.042	6.06	6.05	6.04
4/26/05	44	3	3	M	30	0.032	0.036	0.034	0.033	6.07	6.09	6.07
4/26/05	689	3	3	H	30	0.032	0.032	0.031	0.034	6.08	6.1	6.09
4/28/05	199	3	5	C	10	0.031	0.031	0.036	0.036	6.13	6.14	6.04
4/28/05	219	3	5	B	10	0.033	0.045	0.032	0.046	6.19	6.13	6.06
4/28/05	474	3	5	R	10	0.02	0.024	0.033	0.035	6.15	6.1	6.07
4/28/05	151	3	5	L	10	0.03	0.038	0.027	0.026	6.23	6.17	6.14

4/28/05	428	3	5	M	10	0.03	0.037	0.03	0.025	6.22	6.22	6.15
4/28/05	588	3	5	H	10	0.036	0.037	0.034	0.035	6.27	6.24	6.2
4/28/05	192	3	5	C	20	0.026	0.027	0.029	0.038	6.23	6.18	6.15
4/28/05	182	3	5	B	20	0.052	0.023	0.03	0.048	6.22	6.2	6.16
4/28/05	577	3	5	R	20	0.027	0.032	0.033	0.038	6.26	6.31	6.24
4/28/05	874	3	5	L	20	0.035	0.038	0.023	0.03	6.41	6.38	6.34
4/28/05	902	3	5	M	20	0.031	0.027	0.031	0.035	6.36	6.35	6.32
4/28/05	217	3	5	H	20	0.035	0.037	0.037	0.038	6.4	6.39	6.33
4/28/05	496	3	5	C	30	0.023	0.024	0.033	0.023	6.25	6.24	6.22
4/28/05	780	3	5	B	30	0.023	0.023	0.027	0.037	6.27	6.24	6.25
4/28/05	685	3	5	R	30	0.037	0.038	0.035	0.039	6.31	6.36	6.28
4/28/05	966	3	5	L	30	0.027	0.036	0.028	0.03	6.32	6.36	6.31
4/28/05	235	3	5	M	30	0.023	0.028	0.031	0.029	6.4	6.35	6.3
4/28/05	705	3	5	H	30	0.034	0.034	0.04	0.046	6.38	6.38	6.38

MINOLTA

Date	C3D	Rep	Day	Trt	Fat	L*1	L*2	L*3	a*1	a*2	a*3	b*1	b*2	b*3
4/9	281	1	0	C	10	52.34	47.71	50.96	23.21	22.25	21.61	12.08	10.58	11.09
4/9	846	1	0	B	10	46.12	44.85	45.6	20.04	21.79	18.53	9.25	10.25	8.41
4/9	422	1	0	R	10	47.41	45.36	45.47	20.76	22.07	19.89	10.19	10.34	9.11
4/9	119	1	0	L	10	47.55	45.23	49.49	20.83	19.52	21.41	11.14	8.93	11.03
4/9	463	1	0	M	10	43.1	47.9	47.6	20.45	15.93	18.68	10.33	9.07	9.89
4/9	12	1	0	H	10	43.66	45.74	43.77	16.57	15.68	19.17	8.06	7.76	9.22
4/9	253	1	0	C	20	45.62	45.92	48.56	18.79	20.9	20.54	10.07	9.45	10.99
4/9	111	1	0	B	20	50.37	50.34	55.77	21.67	20.07	20.64	11.04	11.36	12.58
4/9	778	1	0	R	20	45.97	54.69	49.99	21	20.69	19.21	10.48	12.47	9.01
4/9	798	1	0	L	20	47.63	45.14	49.94	20.86	21.63	20.44	11.41	9.82	9.63
4/9	190	1	0	M	20	51.01	47.37	50.49	18.08	18.91	19.08	10.99	11.45	9.97
4/9	593	1	0	H	20	46.51	49.03	48.37	21.85	17.88	15.01	11.29	9.44	7.42
4/9	155	1	0	C	30	58.95	54.92	51.96	21	18.39	26.36	12.75	11	14.22
4/9	777	1	0	B	30	51.95	59.63	52.77	24.01	17.73	21.4	13.1	11.92	11.98
4/9	434	1	0	R	30	59.67	48.2	54.14	21.51	24.25	22.41	14.35	12.13	12.58
4/9	591	1	0	L	30	54.66	52.93	50.36	23.1	18.66	23.33	12.98	11.09	12.31
4/9	674	1	0	M	30	54.99	46.29	53.74	19.2	21.41	18.99	11.72	10.53	11.75
4/9	52	1	0	H	30	61.2	50.89	60.06	19.11	21.72	18.08	11.65	11.14	13.09
4/10	345	1	1	C	10	49.01	47.47	49.54	19.87	18.89	21.45	1.091	8.95	10.75
4/10	830	1	1	B	10	44.25	44.9	45.25	19.04	18.05	19.96	8.53	8.74	9.65
4/10	514	1	1	R	10	47.64	47.99	48.68	18.42	18.73	19.82	8.53	9.4	10.37
4/10	652	1	1	L	10	44.87	43.25	44.58	16.8	18.66	18.42	7.43	8.49	8.95
4/10	891	1	1	M	10	46.39	45	43.86	10.58	15.07	15.36	8	7.18	7.4
4/10	822	1	1	H	10	43.27	44.97	46.43	15.85	15.6	16.67	7.7	8.53	10.11
4/10	923	1	1	C	20	47.2	45.96	48.35	15.77	16.73	19.01	8.38	8.06	9.8
4/10	483	1	1	B	20	48.62	46.42	50.26	18.14	18.75	10.03	9.83	9.07	8.72
4/10	230	1	1	R	20	42.39	40.74	45.63	21.31	18.11	20.5	10.46	9.86	10.29
4/10	75	1	1	L	20	52.69	51.64	47.35	20.21	20.19	17.7	12.09	12.84	9.86
4/10	485	1	1	M	20	48.05	48.81	47.14	16.74	22.86	19.26	8.84	12.34	9.18
4/10	789	1	1	H	20	45.36	43.46	46.25	16.33	16.76	18.83	8.88	8.33	11.07
4/10	722	1	1	C	30	56.86	46.01	61.89	17.35	23	18.52	10.36	10.78	11.77
4/10	264	1	1	B	30	56.52	55.24	51.09	21.02	20.27	23.55	12.03	11.2	14.08
4/10	92	1	1	R	30	57.87	50.08	61.7	16.47	20.96	15.56	11.38	10.56	10.6
4/10	177	1	1	L	30	52.11	45.13	52.66	20.25	21.36	22.82	11.6	12.07	12.88
4/10	600	1	1	M	30	47.65	49.31	47.35	23.23	19.22	22.66	12.25	9.53	11.4
4/10	488	1	1	H	30	56.08	51.53	58.5	17.97	20.06	18.67	11.73	10.35	12.32
4/12	879	1	3	C	10	49.53	42.94	45.49	14.18	17.77	17.49	9.08	8.12	9.08
4/12	321	1	3	B	10	45.81	46.6	44.81	18.26	17.14	19.23	7.92	8.31	8.98

4/12	297	1	3	R	10	46.18	44.5	46.6	17.97	17.27	18.16	8.52	8.3	8.9
4/12	781	1	3	L	10	44.15	43.54	45.63	15.67	14.66	12.97	7.94	7.57	6.38
4/12	821	1	3	M	10	43.09	43.42	43.52	12.52	14.2	13.45	6.68	7.6	8.03
4/12	793	1	3	H	10	43.08	42.47	42.44	13.46	14.78	12.97	6.59	7.89	6.93
4/12	54	1	3	C	20	55.14	45.7	48.2	14.64	16.1	17.61	7.66	8.94	10.03
4/12	930	1	3	B	20	47.94	49.46	47.6	16.72	15.75	14.69	8.02	8.56	7.95
4/12	767	1	3	R	20	48.07	43.69	47.14	16.44	16.59	17.36	9.02	7.79	9.74
4/12	215	1	3	L	20	50.89	49.73	51.51	13.46	15.45	13.01	9.38	10.37	8.79
4/12	605	1	3	M	20	42.36	53.65	45.19	15.45	12.48	17.11	9.77	9.23	8.46
4/12	800	1	3	H	20	46.7	45.26	42.66	13	11.49	14.22	9.35	7.35	6.37
4/12	794	1	3	C	30	53.5	58.68	38.66	15.63	12.06	15.88	10.26	8.84	7.39
4/12	549	1	3	B	30	57.02	60.21	49.76	16.14	16.89	21.39	11.79	12	11.74
4/12	526	1	3	R	30	57.73	57.74	58.12	13.93	18.07	17.91	10.28	11.15	12.56
4/12	649	1	3	L	30	46.84	43.18	45.31	15.56	20.51	17.15	8.75	9.01	8.85
4/12	1	1	3	M	30	50.76	49.11	48.91	14.6	16.03	15.71	10.32	9.5	9.66
4/12	261	1	3	H	30	51.14	49.44	53.61	15.51	19.4	17.98	9.8	11.18	11.74
4/14	318	1	5	C	10	48.03	46.88	44.49	18.95	18.09	17.4	10.18	9.06	7.9
4/14	710	1	5	B	10	47.13	46.08	47.15	17.79	17.92	16.77	8.52	8.38	8.43
4/14	728	1	5	R	10	45.06	46.24	43.39	17.97	18.3	18.94	9.76	9.59	9.72
4/14	455	1	5	L	10	44.9	43.62	44.81	12	12.66	11.68	6.83	6.71	6.39
4/14	731	1	5	M	10	46.04	43.52	43.69	12	11.3	13.16	7.3	5.94	7.55
4/14	115	1	5	H	10	44.07	44.17	42.36	10.74	10.36	11.08	6.87	6.42	6.52
4/14	992	1	5	C	20	44.78	47.23	48.21	18.81	15.54	15.31	9.21	8.64	8.06
4/14	425	1	5	B	20	45.11	47.51	48.58	15.97	15.65	16.58	7.68	7.69	9.5
4/14	945	1	5	R	20	47.54	49.57	48.71	16.5	16.9	18.78	8.69	9.22	10.95
4/14	196	1	5	L	20	44.04	44.89	44.78	13.19	14.75	14.15	6.89	8.66	8.47
4/14	17	1	5	M	20	43.33	45.2	46.04	14.15	10.95	12.63	7.95	6.07	8.59
4/14	543	1	5	H	20	46.23	43.77	43.26	11.72	10.87	12.91	9.29	7.59	8.57
4/14	703	1	5	C	30	41.51	49.59	50	17.1	17.08	19.33	8.13	9.78	12.46
4/14	557	1	5	B	30	47.34	46.57	51.73	20.43	19.72	16.54	12.32	10.11	11.26
4/14	535	1	5	R	30	51.11	54.22	46.74	13.95	15.58	19.93	8.73	9.33	10.19
4/14	757	1	5	L	30	51.98	49.01	50.34	11.52	11.46	14.01	9.98	10.84	9.28
4/14	990	1	5	M	30	49.21	49.85	47.26	10.71	11.6	12.86	8.65	9.54	8.42
4/14	438	1	5	H	30	47.47	50.79	50	15.99	14.47	17.02	7.75	8.79	9.72
4/16	7	2	0	C	10	43.41	45.61	46.62	20.25	23.55	21.12	8.74	10.87	9.87
4/16	501	2	0	B	10	46.74	46.18	48.37	22.15	21.45	20.98	10.39	10.27	10.39
4/16	717	2	0	R	10	46.79	47.2	45.46	24.04	21.51	22.3	11.43	10.65	10.41
4/16	733	2	0	L	10	45.86	44.89	44.98	18.01	20.25	20.03	8.11	9.65	9.59
4/16	260	2	0	M	10	43.39	43.78	44.7	16.98	17.48	16.88	8.21	8.57	8.1
4/16	959	2	0	H	10	43.14	42.71	42.46	17	15.59	18.53	7.3	7.8	8.85
4/16	636	2	0	C	20	46.78	51.17	46.23	24.06	26.14	27.55	10.98	13.16	12.32

4/16	978	2	0	B	20	48.74	49.23	49.4	24.57	26.09	24.62	11.91	12.47	12.32
4/16	500	2	0	R	20	49.5	49.17	52.67	24.63	25.82	25.71	11.17	12.58	13.65
4/16	487	2	0	L	20	551.86	48.76	49.89	21.53	25.08	21.72	11.54	12.42	10.93
4/16	951	2	0	M	20	52.22	46.58	45.95	21.44	19.98	21.34	12.2	9.8	10.75
4/16	195	2	0	H	20	47.16	47.05	44.66	18.86	20.94	21.25	8.46	11.12	9.8
4/16	430	2	0	C	30	48.14	53.33	50.83	27.76	24.9	21.17	12.13	13.38	13.4
4/16	284	2	0	B	30	50.81	47.33	49.35	23.92	25.56	24.93	11.26	12.1	11.87
4/16	212	2	0	R	30	52.68	51.63	52.2	22.49	27.33	26.93	12.24	14.81	14.48
4/16	362	2	0	L	30	53.03	51.48	52.52	21.32	22.11	26.49	11.49	9.63	14.51
4/16	625	2	0	M	30	51.89	52.12	55.34	21.77	22.11	19.34	11.35	13	12.06
4/16	825	2	0	H	30	47.65	47.58	47.61	19.59	20.81	21.61	10.99	11.5	11.43
4/17	493	2	1	C	10	42.44	41.96	43.78	17.73	17.59	10.04	8.16	8.24	8.62
4/17	81	2	1	B	10	43.99	47.06	44.95	21.85	21.18	19.77	11.27	10.1	9.06
4/17	925	2	1	R	10	47.09	44.68	44.99	19.85	18.56	19.22	10.58	8.63	9
4/17	99	2	1	L	10	41.26	43.31	42.68	18.41	17.11	17.63	9.59	9.94	8.81
4/17	507	2	1	M	10	42.91	43.9	41.63	12.71	15.84	14.52	5.42	7.92	7.13
4/17	144	2	1	H	10	42.5	42.31	43.73	11.47	13.32	14.29	5.6	6.79	7.4
4/17	327	2	1	C	20	46.52	48.4	46.18	20.5	18.08	20.98	10.41	8.68	11.39
4/17	856	2	1	B	20	47.12	47.89	47.91	20.75	20.46	25.04	11.23	10.1	12.04
4/17	89	2	1	R	20	46.27	47.48	40.41	21.41	19.25	18.13	10.33	10.11	9.06
4/17	523	2	1	L	20	45.73	49.08	46.81	19.83	19.33	18.91	9.88	10.47	10.2
4/17	596	2	1	M	20	46.3	48.71	47.11	19.66	18.52	17.66	10.08	9.96	9.99
4/17	293	2	1	H	20	42.87	46.19	46.54	18.37	16.96	16.1	8.63	8.26	8.93
4/17	675	2	1	C	30	45.74	47.04	49.95	22.43	21.57	25.11	10.5	9.3	13.63
4/17	898	2	1	B	30	49.15	5031	49.7	19.79	25.38	22.45	9.73	12.64	11.04
4/17	637	2	1	R	30	52.96	48.58	48.56	20.22	27.61	25.75	11.55	13.93	13.21
4/17	361	2	1	L	30	48.47	49.35	47.69	21.78	22.39	20.39	10.97	11.29	9.51
4/17	989	2	1	M	30	51.98	52.5	51.87	17.47	18.62	19.32	10.49	10.69	11.02
4/17	0	2	1	H	30	44.47	48.46	47.12	18.3	14.65	19.99	9.36	8.82	11.59
4/19	171	2	3	C	10	44.57	44.75	44.09	13.97	13.83	14.3	7.51	6.84	8.51
4/19	225	2	3	B	10	48.58	47.71	44.3	20.03	18.44	19.11	10.16	8.63	8.5
4/19	544	2	3	R	10	45.02	49.2	46.02	19.93	16.95	19.42	9.59	8.16	9.85
4/19	958	2	3	L	10	43.2	42.68	44.23	13.84	15.33	15.74	8.89	8.21	8.14
4/19	899	2	3	M	10	43.76	41.8	42.07	12.78	14.08	10.65	7.4	8.08	6.17
4/19	10	2	3	H	10	47.74	40.2	44.67	11.59	11.74	11.1	7.59	7.17	6.24
4/19	738	2	3	C	20	46.56	44.75	18.8	20.03	17.14	17.14	10.04	10.68	8.71
4/19	22	2	3	B	20	53.82	48.87	46.47	17.74	20.16	20.67	10.75	12.66	10.52
4/19	385	2	3	R	20	44.6	49.28	48.5	21.21	20.35	17.44	10.9	11.06	9.4
4/19	354	2	3	L	20	47.67	48.94	47.95	14.3	16.57	16.11	8.27	9.29	8.85
4/19	203	2	3	M	20	46.18	48.12	47.5	13.3	14.26	13.08	7.49	9.09	8.14
4/19	770	2	3	H	20	44.56	44.85	43.7	13.25	12.62	14.75	6.97	7.24	8.21

4/19	87	2	3	C	30	46.67	48.54	53.3	19.9	19.01	16.39	10.78	11.57	10.3
4/19	252	2	3	B	30	49.26	53.51	48.07	20.1	19.48	24.62	9.45	11.09	12.19
4/19	315	2	3	R	30	52.37	50.22	46.21	20.14	18.97	24.85	10.82	10.44	11.84
4/19	407	2	3	L	30	50.91	47.51	47.69	18.6	17.95	22.87	11.69	9.31	12.67
4/19	397	2	3	M	30	47.31	56.31	49.99	13.51	13.4	16.41	8.96	12.43	11.23
4/19	704	2	3	H	30	46.42	46.57	45.42	14.2	14.45	18.31	8.55	10.19	9.68
4/21	656	2	5	C	10	42.13	49.16	49.01	13.58	12.8	11.79	7.19	8.56	8.64
4/21	734	2	5	B	10	45.13	43.57	50.67	16.62	20.11	17.49	7.69	10.56	11.32
4/21	349	2	5	R	10	45.71	46.51	44.4	19.68	18.8	18.35	10.99	11.81	10.33
4/21	433	2	5	L	10	46.95	42.91	43.57	13.95	10.97	13.12	8.19	6.47	7.59
4/21	617	2	5	M	10	41.84	41.04	43.84	11.05	10.17	10.57	6.29	5.43	6.93
4/21	153	2	5	H	10	45.74	46.3	41.8	8.75	9.02	10.08	6.44	5.99	6.2
4/21	515	2	5	C	20	47.54	50.85	42.57	14.94	15.48	20.62	9.57	10.67	10.92
4/21	909	2	5	B	20	48.42	55.89	49.21	16.53	14.06	16.99	9.12	10.32	9.85
4/21	23	2	5	R	20	49.81	56.62	53.33	16.7	14.24	14.7	11.12	11.88	11.61
4/21	409	2	5	L	20	53.62	49.31	47.72	10.87	14.01	11.39	8.53	9.34	8.45
4/21	14	2	5	M	20	44.18	47.21	48.84	11.96	12.36	13.56	7.48	9.05	10.83
4/21	831	2	5	H	20	41.01	43.61	48.71	12.05	9.5	9.79	7.57	7.08	9.05
4/21	938	2	5	C	30	45.47	56.5	60.72	16.08	15.48	10.21	8.21	12.78	11.01
4/21	302	2	5	B	30	57.47	55.44	52.61	14.37	15.89	15.92	10.76	11.8	9.93
4/21	582	2	5	R	30	54.94	51.65	52.85	8.53	11.83	10.09	8.96	10.47	9.37
4/21	427	2	5	L	30	54.07	51.8	47.55	10.16	10.95	12.5	9.97	9.62	10.37
4/21	998	2	5	M	30	49.86	52.87	50.75	8.06	7.51	8.54	8.53	9.66	10.36
4/21	646	2	5	H	30	51.55	55.4	56.53	9.63	8.75	9.54	8.98	10.21	10.08
4/23	709	3	0	C	10	44.68	45.72	51.32	20.15	20.33	22.03	8.32	9.05	11.19
4/23	73	3	0	B	10	48.99	47.71	46.71	21.2	23	22.5	10.7	11	10.77
4/23	976	3	0	R	10	47.56	48.31	48.7	23.03	22.7	23.57	10.9	10.82	11.2
4/23	653	3	0	L	10	48.47	49.82	47.46	18.4	21.88	21.95	9.33	11.26	11.34
4/23	570	3	0	M	10	4926	47.36	45.49	18.77	19.11	22.04	8.87	8.53	9.89
4/23	256	3	0	H	10	44.86	44.28	45.56	17.6	17.17	19.94	8.68	7.71	9.9
4/23	288	3	0	C	20	51.54	47.79	44.45	23.72	21.66	20.7	12.79	10.26	8.83
4/23	880	3	0	B	20	51.88	52.44	54.51	24.38	25.09	23.73	13.36	13.53	13.99
4/23	209	3	0	R	20	51.7	50.72	54.71	23.25	22.71	21.06	12.6	11.8	13.01
4/23	538	3	0	L	20	47.32	51.85	56.41	22.58	22.8	21	10.66	12.16	11.04
4/23	808	3	0	M	20	53.09	50.3	50.44	21.22	22.63	22.46	13.05	12.56	12.45
4/23	737	3	0	H	20	48.8	47.24	49.12	20.02	17.68	21.32	10.6	8.59	10.9
4/23	587	3	0	C	30	51.54	58.2	49.9	25.2	24.76	25.34	9.87	14.54	12.63
4/23	750	3	0	B	30	57.31	57.14	57.55	22.21	24.22	20.72	13.38	13.94	12.43
4/23	37	3	0	R	30	57.65	49.48	53.91	20.95	25.9	28.87	12.69	13.06	15.28
4/23	917	3	0	L	30	51.53	58.36	54.74	26.05	20.41	25.71	12.72	10.88	15.06
4/23	400	3	0	M	30	53.76	52.03	52.38	23.58	24.7	26.51	14.06	13.87	13.66

4/23	610	3	0	H	30	50.37	51.67	50.07	19.93	18.59	19.2	11.19	10.58	11.37
4/24	612	3	1	C	10	44.76	41.38	49.62	15.18	22.81	19.41	7.09	10.81	11.87
4/24	45	3	1	B	10	47.07	45.42	42.95	20.81	19.72	18.95	10.1	9.63	9.51
4/24	420	3	1	R	10	44.36	45.05	44.73	19.04	18.69	20.07	10.79	9.16	10.87
4/24	444	3	1	L	10	42.31	44.56	44.98	20.82	19.65	17.81	11.2	11.83	8.42
4/24	287	3	1	M	10	44.96	41.7	44.42	14.19	16.58	16.09	6.97	9.16	8.56
4/24	331	3	1	H	10	42.17	40.78	41.42	16.25	13.59	16.59	7.64	6.12	7.89
4/24	619	3	1	C	20	59.53	63.14	55.11	18.25	15.55	19.08	13.29	12.2	12.88
4/24	337	3	1	B	20	58.43	50.06	49.33	17.69	18.59	18.11	14.29	10.69	9.19
4/24	162	3	1	R	20	49.57	48.24	52.45	19.3	20.26	18.74	12.28	11.64	11.74
4/24	819	3	1	L	20	52.52	54.26	42.53	19	17.72	17.27	12.32	11.33	9.14
4/24	266	3	1	M	20	46.61	47.33	46.75	17.94	17.89	17.92	10.05	9.89	10.53
4/24	147	3	1	H	20	49.98	52.22	47.35	17.94	15.17	16.73	9.17	10.51	9.62
4/24	189	3	1	C	30	47.49	45.85	51.07	21.38	21.55	23.81	10.61	10.72	12.07
4/24	785	3	1	B	30	51.1	48.93	55.85	21.71	19.61	21.74	12.7	10.26	15.99
4/24	629	3	1	R	30	49.49	51.85	53.33	21.79	16.19	17.07	12.54	9.11	10.46
4/24	764	3	1	L	30	47.49	50.92	48.16	18.97	17.84	23.35	9.77	10.65	12.25
4/24	865	3	1	M	30	52.52	58.4	52	16.93	16.24	17.58	11.11	12.16	11.17
4/24	701	3	1	H	30	47.75	47.05	50.6	16.06	18.02	15.24	9.55	9.59	10.43
4/26	980	3	3	C	10	39.09	37.47	44.6	19.18	17.5	20.77	8.71	8.49	9.68
4/26	60	3	3	B	10	44.89	42.66	45.5	21.14	17.46	18.11	12.1	8.1	9.24
4/26	426	3	3	R	10	45.63	46.17	51.43	17.68	18.79	18.22	8.66	10.27	10.41
4/26	581	3	3	L	10	39.94	40.71	44.47	18.55	18.69	15.75	9.62	10.29	7.36
4/26	519	3	3	M	10	43.82	42.95	42.33	17.21	16.67	16.82	7.71	7.41	7.91
4/26	356	3	3	H	10	42.72	42.14	42	14.03	16.63	13.91	7.71	8.63	7.21
4/26	885	3	3	C	20	40.41	42.53	40.34	27.23	23.56	18.73	12.09	11.11	9.04
4/26	221	3	3	B	20	46.46	49.32	52.5	21.77	19.86	16.91	10.71	10.43	9.38
4/26	664	3	3	R	20	45.02	44.82	50.95	21.76	18.48	20.82	11.17	9.05	11.89
4/26	545	3	3	L	20	49.58	45.26	45.72	20.12	18.04	19.13	12.35	9.11	10.9
4/26	81	3	3	M	20	47.41	44.1	47.93	16.67	20.06	18.59	8.98	11.37	9.92
4/26	187	3	3	H	20	47.64	39.77	45.92	13.55	17.33	16.71	9.29	10.05	8.88
4/26	68	3	3	C	30	48.07	37.65	45.36	17.77	25.71	24.82	9.69	12.78	12.95
4/26	572	3	3	B	30	49.65	47.39	50.72	19.07	22.41	23.32	10.86	11.3	12.21
4/26	11	3	3	R	30	50.31	51.72	47.99	24.78	22.55	20.4	13.74	12.76	10.16
4/26	994	3	3	L	30	50.34	50.41	46.92	18.6	21.19	21.7	10.52	13.06	12.07
4/26	44	3	3	M	30	41.66	46.43	46.7	19.66	21.51	17	11.24	13.56	9.21
4/26	689	3	3	H	30	51.02	42.93	47.41	16.06	14.78	15.5	10.82	7.7	10.13
4/28	199	3	5	C	10	39.34	44.43	40.41	15.76	11.68	12.34	9.17	7.49	6.47
4/28	219	3	5	B	10	39.71	45.93	46.66	13.57	11.09	9.92	9.43	7.76	7.49
4/28	474	3	5	R	10	45.38	44.18	43.72	17.12	14.65	14.96	9.97	7.7	7.11
4/28	151	3	5	L	10	45.62	42.06	43.34	16.93	15.96	14.75	9.23	10.19	7.72

4/28	428	3	5	M	10	43.35	42.05	41.4	13.48	15.27	16.25	7.27	8.26	7.83
4/28	588	3	5	H	10	41.33	45.07	42.58	10.83	11.26	13.89	6.15	7.76	7.81
4/28	192	3	5	C	20	40.51	44.69	42.41	12.41	12.94	16.1	6.57	10.55	11.78
4/28	182	3	5	B	20	50.87	48.37	56.4	15.95	16.76	15.29	9.87	10.81	12.44
4/28	577	3	5	R	20	41.6	44.19	44.66	13.8	15.32	14.68	6.78	9.85	9.27
4/28	874	3	5	L	20	41.19	50.4	47.85	13.89	11.98	9.72	10.75	11.79	8.05
4/28	902	3	5	M	20	50.06	45.93	45.88	12.11	14.72	12.97	9.51	9.05	7.63
4/28	217	3	5	H	20	43.01	45.34	46.6	12.55	11.88	11.84	7.86	8.75	7.69
4/28	496	3	5	C	30	44.86	42.74	46.72	14.84	20.33	14.53	9.73	12.38	9.05
4/28	780	3	5	B	30	44.68	49.42	56.97	23.79	21.07	17.22	12.66	10.89	13.21
4/28	685	3	5	R	30	47	51.29	46.84	13.96	13.45	14.55	11.6	9.72	10.09
4/28	966	3	5	L	30	49.23	53.09	49.63	16.84	15.86	15.56	9.32	10.42	9.37
4/28	235	3	5	M	30	48.24	47.17	51.38	10.95	12.68	11.75	13.41	12.48	13.89
4/28	705	3	5	H	30	44.67	49.45	49.45	10.16	8.74	11.08	8.8	10.16	10.02

COLOR PANEL

Date	C3D	Order	Rep	Day	Trt	Fat	Panel	Lean	Discolor	Adiscolor	Comments
4/10	155	1	1	0	30	C	Hemphill	4	0	1	
4/10	253	1	1	0	20	C	Hemphill	3	0	1	
4/10	798	1	1	0	20	L	Hemphill	4	0	1	
4/10	281	1	1	0	10	C	Hemphill	3	2	2	
4/10	12	1	1	0	10	H	Hemphill	3	0	1	
4/10	111	1	1	0	20	B	Hemphill	3	0	1	
4/10	190	1	1	0	20	M	Hemphill	4	0	1	
4/10	52	1	1	0	30	H	Hemphill	3	0	1	
4/10	422	1	1	0	10	R	Hemphill	3	0	1	
4/10	434	1	1	0	30	R	Hemphill	4	0	1	
4/10	846	1	1	0	10	B	Hemphill	3	0	1	
4/10	593	1	1	0	20	H	Hemphill	2	0	1	
4/10	674	1	1	0	30	M	Hemphill	4	0	1	
4/10	778	1	1	0	20	R	Hemphill	3	0	1	
4/10	119	1	1	0	10	L	Hemphill	3	0	1	
4/10	463	1	1	0	10	M	Hemphill	3	0	1	
4/10	777	1	1	0	30	B	Hemphill	3	0	1	
4/10	591	1	1	0	30	L	Hemphill	3	0	1	
4/10	155	1	1	0	30	C	Kim	4	0	1	
4/10	253	1	1	0	20	C	Kim	2.5	0	1	
4/10	798	1	1	0	20	L	Kim	3	0	1	
4/10	281	1	1	0	10	C	Kim	3	0	1	
4/10	12	1	1	0	10	H	Kim	1.5	0	1	
4/10	111	1	1	0	20	B	Kim	4.5	0	1	
4/10	190	1	1	0	20	M	Kim	4	0	1	
4/10	52	1	1	0	30	H	Kim	5	0	1	
4/10	422	1	1	0	10	R	Kim	2	0	1	
4/10	434	1	1	0	30	R	Kim	4.5	0	1	
4/10	846	1	1	0	10	B	Kim	2	0	1	
4/10	593	1	1	0	20	H	Kim	1	0	1	
4/10	674	1	1	0	30	M	Kim	4	0	1	
4/10	778	1	1	0	20	R	Kim	3.5	0	1	
4/10	119	1	1	0	10	L	Kim	2	0	1	
4/10	463	1	1	0	10	M	Kim	1.5	0	1	
4/10	777	1	1	0	30	B	Kim	5	0	1	
4/10	591	1	1	0	30	L	Kim	4.5	0	1	
4/10	155	1	1	0	30	C	Rhoades	3	0	1	
4/10	253	1	1	0	20	C	Rhoades	3	0	1	
4/10	798	1	1	0	20	L	Rhoades	3	0	1	
4/10	281	1	1	0	10	C	Rhoades	4	2	2	
4/10	12	1	1	0	10	H	Rhoades	2	0	1	
4/10	111	1	1	0	20	B	Rhoades	3	0	1	
4/10	190	1	1	0	20	M	Rhoades	3	0	1	
4/10	52	1	1	0	30	H	Rhoades	4	0	1	
4/10	422	1	1	0	10	R	Rhoades	3	0	1	
4/10	434	1	1	0	30	R	Rhoades	4	0	1	
4/10	846	1	1	0	10	B	Rhoades	3	0	1	
4/10	593	1	1	0	20	H	Rhoades	2	0	1	
4/10	674	1	1	0	30	M	Rhoades	5	0	1	
4/10	778	1	1	0	20	R	Rhoades	3	0	1	
4/10	119	1	1	0	10	L	Rhoades	2	0	1	
4/10	463	1	1	0	10	M	Rhoades	2	0	1	
4/10	777	1	1	0	30	B	Rhoades	3	0	1	

4/10	591	1	1	0	30	L	Rhoades	3	0	1
4/10	155	1	1	0	30	C	Shin	4	0	1
4/10	253	1	1	0	20	C	Shin	4	0	1
4/10	798	1	1	0	20	L	Shin	4	0	1
4/10	281	1	1	0	10	C	Shin	4	0	1
4/10	12	1	1	0	10	H	Shin	3	0	1
4/10	111	1	1	0	20	B	Shin	4	0	1
4/10	190	1	1	0	20	M	Shin	4	0	1
4/10	52	1	1	0	30	H	Shin	5	0	1
4/10	422	1	1	0	10	R	Shin	3	0	1
4/10	434	1	1	0	30	R	Shin	5	0	1
4/10	846	1	1	0	10	B	Shin	3	0	1
4/10	593	1	1	0	20	H	Shin	3	0	1
4/10	674	1	1	0	30	M	Shin	4	0	1
4/10	778	1	1	0	20	R	Shin	4	0	1
4/10	119	1	1	0	10	L	Shin	3	0	1
4/10	463	1	1	0	10	M	Shin	3	0	1
4/10	777	1	1	0	30	B	Shin	4	0	1
4/10	591	1	1	0	30	L	Shin	4	0	1
4/10	155	1	1	0	30	C	Espitia	3	0	1
4/10	253	1	1	0	20	C	Espitia	3	0	1
4/10	798	1	1	0	20	L	Espitia	3	0	1
4/10	281	1	1	0	10	C	Espitia	2	0	1
4/10	12	1	1	0	10	H	Espitia	2	0	1
4/10	111	1	1	0	20	B	Espitia	3	0	1
4/10	190	1	1	0	20	M	Espitia	3	0	1
4/10	52	1	1	0	30	H	Espitia	2	0	1
4/10	422	1	1	0	10	R	Espitia	4	0	1
4/10	434	1	1	0	30	R	Espitia	3	0	1
4/10	846	1	1	0	10	B	Espitia	4	0	1
4/10	593	1	1	0	20	H	Espitia	3	0	1
4/10	674	1	1	0	30	M	Espitia	2	0	1
4/10	778	1	1	0	20	R	Espitia	3	0	1
4/10	119	1	1	0	10	L	Espitia	4	0	1
4/10	463	1	1	0	10	M	Espitia	3	0	1
4/10	777	1	1	0	30	B	Espitia	3	0	1
4/10	591	1	1	0	30	L	Espitia	3	0	1
4/10	155	1	1	0	30	C	Schell	2	0	1
4/10	253	1	1	0	20	C	Schell	2	0	1
4/10	798	1	1	0	20	L	Schell	3	0	1
4/10	281	1	1	0	10	C	Schell	2	0	1
4/10	12	1	1	0	10	H	Schell	2	0	1
4/10	111	1	1	0	20	B	Schell	2	0	1
4/10	190	1	1	0	20	M	Schell	3	0	1
4/10	52	1	1	0	30	H	Schell	4	0	1
4/10	422	1	1	0	10	R	Schell	2	0	1
4/10	434	1	1	0	30	R	Schell	3	0	1
4/10	846	1	1	0	10	B	Schell	3	0	1
4/10	593	1	1	0	20	H	Schell	2	0	1
4/10	674	1	1	0	30	M	Schell	4	0	1
4/10	778	1	1	0	20	R	Schell	3	0	1
4/10	119	1	1	0	10	L	Schell	3	0	1
4/10	463	1	1	0	10	M	Schell	3	0	1
4/10	777	1	1	0	30	B	Schell	3	0	1
4/10	591	1	1	0	30	L	Schell	4	0	1
4/11	177	2	1	1	30	L	Hemphill	4	0	1
4/11	92	2	1	1	30	R	Hemphill	4	0	1
4/11	722	2	1	1	30	C	Hemphill	3	0	1
4/11	488	2	1	1	30	H	Hemphill	4	0	1

4/11	264	2	1	1	30	B	Hemphill	4	0	1
4/11	789	2	1	1	20	H	Hemphill	3	0	1
4/11	75	2	1	1	20	L	Hemphill	3	0	1
4/11	600	2	1	1	30	M	Hemphill	4	0	1
4/11	485	2	1	1	20	M	Hemphill	3	0	1
4/11	230	2	1	1	20	R	Hemphill	4	0	1
4/11	923	2	1	1	20	C	Hemphill	4	3	2
4/11	483	2	1	1	20	B	Hemphill	3	0	1
4/11	514	2	1	1	10	R	Hemphill	3	1	2
4/11	830	2	1	1	10	B	Hemphill	3	0	1
4/11	652	2	1	1	10	L	Hemphill	3	0	1
4/11	891	2	1	1	10	M	Hemphill	4	0	1
4/11	822	2	1	1	10	H	Hemphill	3	0	1
4/11	345	2	1	1	10	C	Hemphill	3	1	2
4/11	177	2	1	1	30	L	Kim	5	0	1
4/11	92	2	1	1	30	R	Kim	4	0	1
4/11	722	2	1	1	30	C	Kim	4.5	0	1
4/11	488	2	1	1	30	H	Kim	4.5	0	1
4/11	264	2	1	1	30	B	Kim	5	0	1
4/11	789	2	1	1	20	H	Kim	3.5	0	2
4/11	75	2	1	1	20	L	Kim	3	0	1
4/11	600	2	1	1	30	M	Kim	4.5	0	1
4/11	485	2	1	1	20	M	Kim	2	0	1
4/11	230	2	1	1	20	R	Kim	3	0	1
4/11	923	2	1	1	20	C	Kim	3	0	1
4/11	483	2	1	1	20	B	Kim	3	0	1
4/11	514	2	1	1	10	R	Kim	1.5	0	1
4/11	830	2	1	1	10	B	Kim	1.5	0	1
4/11	652	2	1	1	10	L	Kim	1.5	0	1
4/11	891	2	1	1	10	M	Kim	1.5	0	1
4/11	822	2	1	1	10	H	Kim	1	0	1
4/11	345	2	1	1	10	C	Kim	2	0	1
4/11	177	2	1	1	30	L	Rhoades	5	0	1
4/11	92	2	1	1	30	R	Rhoades	5	0	1
4/11	722	2	1	1	30	C	Rhoades	3	0	1
4/11	488	2	1	1	30	H	Rhoades	5	0	1
4/11	264	2	1	1	30	B	Rhoades	4	0	1
4/11	789	2	1	1	20	H	Rhoades	2	0	1
4/11	75	2	1	1	20	L	Rhoades	3	0	1
4/11	600	2	1	1	30	M	Rhoades	4	0	1
4/11	485	2	1	1	20	M	Rhoades	3	0	1
4/11	230	2	1	1	20	R	Rhoades	4	0	1
4/11	923	2	1	1	20	C	Rhoades	5	3	2
4/11	483	2	1	1	20	B	Rhoades	3	0	1
4/11	514	2	1	1	10	R	Rhoades	2	0	1
4/11	830	2	1	1	10	B	Rhoades	2	0	1
4/11	652	2	1	1	10	L	Rhoades	3	0	1
4/11	891	2	1	1	10	M	Rhoades	2	0	1
4/11	822	2	1	1	10	H	Rhoades	2	0	1
4/11	345	2	1	1	10	C	Rhoades	3	0	1
4/11	177	2	1	1	30	L	Shin	4	0	1
4/11	92	2	1	1	30	R	Shin	3	0	1
4/11	722	2	1	1	30	C	Shin	3	0	1
4/11	488	2	1	1	30	H	Shin	3	0	1
4/11	264	2	1	1	30	B	Shin	5	0	1
4/11	789	2	1	1	20	H	Shin	2	0	1
4/11	75	2	1	1	20	L	Shin	2	0	1
4/11	600	2	1	1	30	M	Shin	4	0	1
4/11	485	2	1	1	20	M	Shin	2	0	1

4/11	230	2	1	1	20	R	Shin	3	0	1
4/11	923	2	1	1	20	C	Shin	2	0	1
4/11	483	2	1	1	20	B	Shin	3	0	1
4/11	514	2	1	1	10	R	Shin	3	0	1
4/11	830	2	1	1	10	B	Shin	3	0	1
4/11	652	2	1	1	10	L	Shin	2	0	1
4/11	891	2	1	1	10	M	Shin	3	0	1
4/11	822	2	1	1	10	H	Shin	2	0	1
4/11	345	2	1	1	10	C	Shin	3	3	2
4/11	177	2	1	1	30	L	Espitia	3	0	1
4/11	92	2	1	1	30	R	Espitia	4	0	1
4/11	722	2	1	1	30	C	Espitia	3	0	1
4/11	488	2	1	1	30	H	Espitia	2	0	1
4/11	264	2	1	1	30	B	Espitia	4	0	1
4/11	789	2	1	1	20	H	Espitia	2	0	1
4/11	75	2	1	1	20	L	Espitia	3	0	1
4/11	600	2	1	1	30	M	Espitia	4	0	1
4/11	485	2	1	1	20	M	Espitia	3	0	1
4/11	230	2	1	1	20	R	Espitia	3	0	1
4/11	923	2	1	1	20	C	Espitia	3	0	1
4/11	483	2	1	1	20	B	Espitia	3	0	1
4/11	514	2	1	1	10	R	Espitia	3	0	1
4/11	830	2	1	1	10	B	Espitia	3	0	1
4/11	652	2	1	1	10	L	Espitia	3	0	1
4/11	891	2	1	1	10	M	Espitia	2	0	1
4/11	822	2	1	1	10	H	Espitia	3	0	1
4/11	345	2	1	1	10	C	Espitia	4	1	2
4/11	177	2	1	1	30	L	Schell	3	0	1
4/11	92	2	1	1	30	R	Schell	3	0	1
4/11	722	2	1	1	30	C	Schell	2	0	1
4/11	488	2	1	1	30	H	Schell	3	0	1
4/11	264	2	1	1	30	B	Schell	3	0	1
4/11	789	2	1	1	20	H	Schell	1	0	1
4/11	75	2	1	1	20	L	Schell	2	0	1
4/11	600	2	1	1	30	M	Schell	2	0	1
4/11	485	2	1	1	20	M	Schell	1	0	1
4/11	230	2	1	1	20	R	Schell	2	0	1
4/11	923	2	1	1	20	C	Schell	1	0	1
4/11	483	2	1	1	20	B	Schell	2	0	1
4/11	514	2	1	1	10	R	Schell	1	0	1
4/11	830	2	1	1	10	B	Schell	1	0	1
4/11	652	2	1	1	10	L	Schell	2	0	1
4/11	891	2	1	1	10	M	Schell	1	0	1
4/11	822	2	1	1	10	H	Schell	1	0	1
4/11	345	2	1	1	10	C	Schell	2	0	1
4/13	879	3	1	3	10	C	Hemphill	3	2	2
4/13	649	3	1	3	30	L	Hemphill	4	3	2
4/13	526	3	1	3	30	R	Hemphill	4	0	1
4/13	794	3	1	3	30	C	Hemphill	4	3	2
4/13	261	3	1	3	30	H	Hemphill	4	3	2
4/13	549	3	1	3	30	B	Hemphill	4	3	2
4/13	800	3	1	3	20	H	Hemphill	2	1	2
4/13	215	3	1	3	20	L	Hemphill	3	0	1
4/13	1	3	1	3	30	M	Hemphill	2	0	1
4/13	605	3	1	3	20	M	Hemphill	2	1	2
4/13	787	3	1	3	20	R	Hemphill	3	2	2
4/13	54	3	1	3	20	C	Hemphill	3	2	2
4/13	930	3	1	3	20	B	Hemphill	3	2	2
4/13	297	3	1	3	10	R	Hemphill	3	2	2

4/13	321	3	1	3	10	B	Hemphill	3	2	2
4/13	781	3	1	3	10	L	Hemphill	3	0	1
4/13	821	3	1	3	10	M	Hemphill	2	0	1
4/13	793	3	1	3	10	H	Hemphill	2	0	1
4/13	879	3	1	3	10	C	Kim	2	0	1
4/13	649	3	1	3	30	L	Kim	3.5	4	2
4/13	526	3	1	3	30	R	Kim	4.5	0	1
4/13	794	3	1	3	30	C	Kim	4	3	2
4/13	261	3	1	3	30	H	Kim	4	0	1
4/13	549	3	1	3	30	B	Kim	4.5	4	2
4/13	800	3	1	3	20	H	Kim	1	2	3
4/13	215	3	1	3	20	L	Kim	2.5	2	2
4/13	1	3	1	3	30	M	Kim	2.5	3	2
4/13	605	3	1	3	20	M	Kim	2	0	1
4/13	787	3	1	3	20	R	Kim	2	3	2
4/13	54	3	1	3	20	C	Kim	2	8	1
4/13	930	3	1	3	20	B	Kim	2.5	0	1
4/13	297	3	1	3	10	R	Kim	2	0	1
4/13	321	3	1	3	10	B	Kim	2	0	1
4/13	781	3	1	3	10	L	Kim	1	2	2
4/13	821	3	1	3	10	M	Kim	1	0	1
4/13	793	3	1	3	10	H	Kim	1	2	2
4/13	879	3	1	3	10	C	Rhoades	3	0	1
4/13	649	3	1	3	30	L	Rhoades	4	0	1
4/13	526	3	1	3	30	R	Rhoades	5	0	1
4/13	794	3	1	3	30	C	Rhoades	4	0	1
4/13	261	3	1	3	30	H	Rhoades	5	0	1
4/13	549	3	1	3	30	B	Rhoades	5	0	1
4/13	800	3	1	3	20	H	Rhoades	2	0	1
4/13	215	3	1	3	20	L	Rhoades	5	3	4
4/13	1	3	1	3	30	M	Rhoades	3	0	1
4/13	605	3	1	3	20	M	Rhoades	4	3	5
4/13	787	3	1	3	20	R	Rhoades	3	0	1
4/13	54	3	1	3	20	C	Rhoades	3	0	1
4/13	930	3	1	3	20	B	Rhoades	3	0	1
4/13	297	3	1	3	10	R	Rhoades	5	0	1
4/13	321	3	1	3	10	B	Rhoades	3	0	1
4/13	781	3	1	3	10	L	Rhoades	2	0	1
4/13	821	3	1	3	10	M	Rhoades	2	0	1
4/13	793	3	1	3	10	H	Rhoades	1	0	1
4/13	879	3	1	3	10	C	Shin	2	4	2
4/13	649	3	1	3	30	L	Shin	4	0	1
4/13	526	3	1	3	30	R	Shin	4	0	1
4/13	794	3	1	3	30	C	Shin	3	4	2
4/13	261	3	1	3	30	H	Shin	4	0	1
4/13	549	3	1	3	30	B	Shin	4	0	1
4/13	800	3	1	3	20	H	Shin	2	0	1
4/13	215	3	1	3	20	L	Shin	3	0	1
4/13	1	3	1	3	30	M	Shin	3	0	1
4/13	605	3	1	3	20	M	Shin	2	0	1
4/13	787	3	1	3	20	R	Shin	3	0	1
4/13	54	3	1	3	20	C	Shin	3	0	1
4/13	930	3	1	3	20	B	Shin	3	0	1
4/13	297	3	1	3	10	R	Shin	3	0	1
4/13	321	3	1	3	10	B	Shin	2	0	1
4/13	781	3	1	3	10	L	Shin	2	0	1
4/13	821	3	1	3	10	M	Shin	2	0	1
4/13	793	3	1	3	10	H	Shin	2	0	1
4/13	879	3	1	3	10	C	Espitia	2	0	1

4/13	649	3	1	3	30	L	Espitia	3	0	1	
4/13	526	3	1	3	30	R	Espitia	3	0	1	
4/13	794	3	1	3	30	C	Espitia	3	0	1	
4/13	261	3	1	3	30	H	Espitia	3	0	1	
4/13	549	3	1	3	30	B	Espitia	3	0	1	
4/13	800	3	1	3	20	H	Espitia	3	1	6	
4/13	215	3	1	3	20	L	Espitia	2	1	2	
4/13	1	3	1	3	30	M	Espitia	3	2	6	
4/13	605	3	1	3	20	M	Espitia	3	2	6	
4/13	787	3	1	3	20	R	Espitia	3	0	1	
4/13	54	3	1	3	20	C	Espitia	3	0	1	
4/13	930	3	1	3	20	B	Espitia	3	0	1	
4/13	297	3	1	3	10	R	Espitia	3	0	1	
4/13	321	3	1	3	10	B	Espitia	3	0	1	
4/13	781	3	1	3	10	L	Espitia	2	0	1	
4/13	821	3	1	3	10	M	Espitia	2	0	1	
4/13	793	3	1	3	10	H	Espitia	1	1	2	
4/13	879	3	1	3	10	C	Schell	3	0	1	
4/13	649	3	1	3	30	L	Schell	2	0	1	
4/13	526	3	1	3	30	R	Schell	3	2	2	
4/13	794	3	1	3	30	C	Schell	3	0	1	
4/13	261	3	1	3	30	H	Schell	2	0	1	
4/13	549	3	1	3	30	B	Schell	2	0	1	
4/13	800	3	1	3	20	H	Schell	1	0	1	
4/13	215	3	1	3	20	L	Schell	3	0	1	
4/13	1	3	1	3	30	M	Schell	1	0	1	
4/13	605	3	1	3	20	M	Schell	2	0	1	
4/13	787	3	1	3	20	R	Schell	2	0	1	
4/13	54	3	1	3	20	C	Schell	3	2	2	
4/13	930	3	1	3	20	B	Schell	2	0	1	
4/13	297	3	1	3	10	R	Schell	1	0	1	
4/13	321	3	1	3	10	B	Schell	2	0	1	
4/13	781	3	1	3	10	L	Schell	1	0	1	
4/13	821	3	1	3	10	M	Schell	1	0	1	
4/13	793	3	1	3	10	H	Schell	1	0	1	
4/15	318	4	1	5	10	C	Hemphill	4	0	1	
4/15	757	4	1	5	30	L	Hemphill	3	1.5	2	
4/15	535	4	1	5	30	R	Hemphill	4	0	1	
4/15	703	4	1	5	30	C	Hemphill	3	2	2	
4/15	438	4	1	5	30	H	Hemphill	4	0	1	
4/15	557	4	1	5	30	B	Hemphill	4	0	1	
4/15	543	4	1	5	20	H	Hemphill	2	0	1	
4/15	196	4	1	5	20	L	Hemphill	3	1.5	2	
4/15	990	4	1	5	30	M	Hemphill	2	1.5	2	
4/15	17	4	1	5	20	M	Hemphill	3	2	2	
4/15	945	4	1	5	20	R	Hemphill	3	0	1	
4/15	992	4	1	5	20	C	Hemphill	4	3	2	
4/15	425	4	1	5	20	B	Hemphill	4	0	1	
4/15	728	4	1	5	10	R	Hemphill	4	0	1	
4/15	710	4	1	5	10	B	Hemphill	3	0	1	
4/15	455	4	1	5	10	L	Hemphill	3	2	2	
4/15	731	4	1	5	10	M	Hemphill	2	0	1	
4/15	115	4	1	5	10	H	Hemphill	1	0	1	
4/15	318	4	1	5	10	C	Kim	2	8	2	Brown/black
4/15	757	4	1	5	30	L	Kim	8	8	4	
4/15	535	4	1	5	30	R	Kim	4.5	0	1	
4/15	703	4	1	5	30	C	Kim	4	8	3	
4/15	438	4	1	5	30	H	Kim	4.5	8	2	
4/15	557	4	1	5	30	B	Kim	5	4	2	

4/15	543	4	1	5	20	H	Kim	1	8	4	
4/15	196	4	1	5	20	L	Kim	2	2	2	
4/15	990	4	1	5	30	M	Kim	8	8	5	
4/15	17	4	1	5	20	M	Kim	2	0	1	
4/15	945	4	1	5	20	R	Kim	3	0	1	
4/15	992	4	1	5	20	C	Kim	3	0	1	
4/15	425	4	1	5	20	B	Kim	3	0	1	
4/15	728	4	1	5	10	R	Kim	4.5	0	1	
4/15	710	4	1	5	10	B	Kim	4.5	2.5	2	
4/15	455	4	1	5	10	L	Kim	1.5	0	1	
4/15	731	4	1	5	10	M	Kim	1.5	0	1	
4/15	115	4	1	5	10	H	Kim	1	8	3	
4/15	318	4	1	5	10	C	Rhoades	0	0	0	GONE
4/15	757	4	1	5	30	L	Rhoades	0	0	0	GONE
4/15	535	4	1	5	30	R	Rhoades	0	0	0	GONE
4/15	703	4	1	5	30	C	Rhoades	0	0	0	GONE
4/15	438	4	1	5	30	H	Rhoades	0	0	0	GONE
4/15	557	4	1	5	30	B	Rhoades	0	0	0	GONE
4/15	543	4	1	5	20	H	Rhoades	0	0	0	GONE
4/15	196	4	1	5	20	L	Rhoades	0	0	0	GONE
4/15	990	4	1	5	30	M	Rhoades	0	0	0	GONE
4/15	17	4	1	5	20	M	Rhoades	0	0	0	GONE
4/15	945	4	1	5	20	R	Rhoades	0	0	0	GONE
4/15	992	4	1	5	20	C	Rhoades	0	0	0	GONE
4/15	425	4	1	5	20	B	Rhoades	0	0	0	GONE
4/15	728	4	1	5	10	R	Rhoades	0	0	0	GONE
4/15	710	4	1	5	10	B	Rhoades	0	0	0	GONE
4/15	455	4	1	5	10	L	Rhoades	0	0	0	GONE
4/15	731	4	1	5	10	M	Rhoades	0	0	0	GONE
4/15	115	4	1	5	10	H	Rhoades	0	0	0	GONE
4/15	318	4	1	5	10	C	Shin	2	2	2	
4/15	757	4	1	5	30	L	Shin	3	2	3	
4/15	535	4	1	5	30	R	Shin	4	0	1	
4/15	703	4	1	5	30	C	Shin	4	3	2	
4/15	438	4	1	5	30	H	Shin	4	0	1	
4/15	557	4	1	5	30	B	Shin	4	4	1	
4/15	543	4	1	5	20	H	Shin	1	4	2	
4/15	196	4	1	5	20	L	Shin	3	0	1	
4/15	990	4	1	5	30	M	Shin	3	4	3	
4/15	17	4	1	5	20	M	Shin	1	4	2	
4/15	945	4	1	5	20	R	Shin	3	0	1	
4/15	992	4	1	5	20	C	Shin	2	4	2	
4/15	425	4	1	5	20	B	Shin	2	0	1	
4/15	728	4	1	5	10	R	Shin	3	0	1	
4/15	710	4	1	5	10	B	Shin	3	0	1	
4/15	455	4	1	5	10	L	Shin	1	0	1	
4/15	731	4	1	5	10	M	Shin	1	2	2	
4/15	115	4	1	5	10	H	Shin	1	0	1	
4/15	318	4	1	5	10	C	Espitia	3	1	2	
4/15	757	4	1	5	30	L	Espitia	3	2	5	
4/15	535	4	1	5	30	R	Espitia	4	0	1	
4/15	703	4	1	5	30	C	Espitia	4	2	2	
4/15	438	4	1	5	30	H	Espitia	3	0	1	
4/15	557	4	1	5	30	B	Espitia	4	0	1	
4/15	543	4	1	5	20	H	Espitia	1	0	1	
4/15	196	4	1	5	20	L	Espitia	2	0	1	
4/15	990	4	1	5	30	M	Espitia	3	2	5	
4/15	17	4	1	5	20	M	Espitia	2	0	1	
4/15	945	4	1	5	20	R	Espitia	3	0	1	

4/15	992	4	1	5	20	C	Espitia	4	2	4
4/15	425	4	1	5	20	B	Espitia	3	0	1
4/15	728	4	1	5	10	R	Espitia	3	0	1
4/15	710	4	1	5	10	B	Espitia	3	0	1
4/15	455	4	1	5	10	L	Espitia	3	1	2
4/15	731	4	1	5	10	M	Espitia	2	0	1
4/15	115	4	1	5	10	H	Espitia	1	0	1
4/15	318	4	1	5	10	C	Schell	3	0	1
4/15	757	4	1	5	30	L	Schell	3	2	2
4/15	535	4	1	5	30	R	Schell	3	0	1
4/15	703	4	1	5	30	C	Schell	3	2	2
4/15	438	4	1	5	30	H	Schell	3	0	1
4/15	557	4	1	5	30	B	Schell	2	0	1
4/15	543	4	1	5	20	H	Schell	1	0	1
4/15	196	4	1	5	20	L	Schell	2	0	1
4/15	990	4	1	5	30	M	Schell	1	0	1
4/15	17	4	1	5	20	M	Schell	1	0	1
4/15	945	4	1	5	20	R	Schell	3	2	2
4/15	992	4	1	5	20	C	Schell	2	0	1
4/15	425	4	1	5	20	B	Schell	2	1	2
4/15	728	4	1	5	10	R	Schell	3	0	1
4/15	710	4	1	5	10	B	Schell	3	0	1
4/15	455	4	1	5	10	L	Schell	1	0	1
4/15	731	4	1	5	10	M	Schell	1	0	1
4/15	115	4	1	5	10	H	Schell	1	0	1
4/17	636	1	2	0	20	C	Hemphill	5	4	2
4/17	7	1	2	0	10	C	Hemphill	2	0	1
4/17	430	1	2	0	30	C	Hemphill	4	0	1
4/17	501	1	2	0	10	B	Hemphill	4	0	1
4/17	717	1	2	0	10	R	Hemphill	3	0	1
4/17	733	1	2	0	10	L	Hemphill	3	0	1
4/17	260	1	2	0	10	M	Hemphill	2.5	0	1
4/17	959	1	2	0	10	H	Hemphill	2.5	0	1
4/17	978	1	2	0	20	B	Hemphill	4	0	1
4/17	500	1	2	0	20	R	Hemphill	4	0	1
4/17	487	1	2	0	20	L	Hemphill	3	0	1
4/17	951	1	2	0	20	M	Hemphill	3.5	0	1
4/17	195	1	2	0	20	H	Hemphill	3.5	0	1
4/17	284	1	2	0	30	B	Hemphill	3.5	0	1
4/17	212	1	2	0	30	R	Hemphill	4	0	1
4/17	362	1	2	0	30	L	Hemphill	4	0	1
4/17	625	1	2	0	30	M	Hemphill	4	0	1
4/17	825	1	2	0	30	H	Hemphill	3	0	1
4/17	636	1	2	0	20	C	Kim	4.5	0	1
4/17	7	1	2	0	10	C	Kim	3.5	0	1
4/17	430	1	2	0	30	C	Kim	5.5	0	1
4/17	501	1	2	0	10	B	Kim	1	0	1
4/17	717	1	2	0	10	R	Kim	1.5	0	1
4/17	733	1	2	0	10	L	Kim	3	0	1
4/17	260	1	2	0	10	M	Kim	2	2	2
4/17	959	1	2	0	10	H	Kim	1	0	1
4/17	978	1	2	0	20	B	Kim	4.5	0	1
4/17	500	1	2	0	20	R	Kim	5	0	1
4/17	487	1	2	0	20	L	Kim	4.5	0	1
4/17	951	1	2	0	20	M	Kim	5.5	0	1
4/17	195	1	2	0	20	H	Kim	1.5	0	1
4/17	284	1	2	0	30	B	Kim	5.5	0	1
4/17	212	1	2	0	30	R	Kim	6	0	1
4/17	362	1	2	0	30	L	Kim	6	0	1

4/17	625	1	2	0	30	M	Kim	6.5	0	1
4/17	825	1	2	0	30	H	Kim	7	0	1
4/17	636	1	2	0	20	C	Rhoades	4	0	1
4/17	7	1	2	0	10	C	Rhoades	3	0	1
4/17	430	1	2	0	30	C	Rhoades	5	0	1
4/17	501	1	2	0	10	B	Rhoades	3	0	1
4/17	717	1	2	0	10	R	Rhoades	4	0	1
4/17	733	1	2	0	10	L	Rhoades	2	0	1
4/17	260	1	2	0	10	M	Rhoades	2	0	1
4/17	959	1	2	0	10	H	Rhoades	1	0	1
4/17	978	1	2	0	20	B	Rhoades	5	0	1
4/17	500	1	2	0	20	R	Rhoades	4	0	1
4/17	487	1	2	0	20	L	Rhoades	5	0	1
4/17	951	1	2	0	20	M	Rhoades	3	0	1
4/17	195	1	2	0	20	H	Rhoades	2	0	1
4/17	284	1	2	0	30	B	Rhoades	5	0	1
4/17	212	1	2	0	30	R	Rhoades	6	0	1
4/17	362	1	2	0	30	L	Rhoades	5	0	1
4/17	625	1	2	0	30	M	Rhoades	6	0	1
4/17	825	1	2	0	30	H	Rhoades	4	0	1
4/17	636	1	2	0	20	C	Shin	5	0	1
4/17	7	1	2	0	10	C	Shin	4	0	1
4/17	430	1	2	0	30	C	Shin	6	0	1
4/17	501	1	2	0	10	B	Shin	4	0	1
4/17	717	1	2	0	10	R	Shin	3	0	1
4/17	733	1	2	0	10	L	Shin	3	0	1
4/17	260	1	2	0	10	M	Shin	3	0	1
4/17	959	1	2	0	10	H	Shin	2	0	1
4/17	978	1	2	0	20	B	Shin	5	0	1
4/17	500	1	2	0	20	R	Shin	5	0	1
4/17	487	1	2	0	20	L	Shin	5	0	1
4/17	951	1	2	0	20	M	Shin	4	0	1
4/17	195	1	2	0	20	H	Shin	3	0	1
4/17	284	1	2	0	30	B	Shin	6	0	1
4/17	212	1	2	0	30	R	Shin	6	0	1
4/17	362	1	2	0	30	L	Shin	5	0	1
4/17	625	1	2	0	30	M	Shin	5	0	1
4/17	825	1	2	0	30	H	Shin	4	0	1
4/17	636	1	2	0	20	C	Espitia	3	0	1
4/17	7	1	2	0	10	C	Espitia	3	0	1
4/17	430	1	2	0	30	C	Espitia	5	0	1
4/17	501	1	2	0	10	B	Espitia	4	0	1
4/17	717	1	2	0	10	R	Espitia	4	0	1
4/17	733	1	2	0	10	L	Espitia	2	0	1
4/17	260	1	2	0	10	M	Espitia	2	0	1
4/17	959	1	2	0	10	H	Espitia	2	0	1
4/17	978	1	2	0	20	B	Espitia	5	0	1
4/17	500	1	2	0	20	R	Espitia	4	0	1
4/17	487	1	2	0	20	L	Espitia	4	0	1
4/17	951	1	2	0	20	M	Espitia	3	0	1
4/17	195	1	2	0	20	H	Espitia	3	0	1
4/17	284	1	2	0	30	B	Espitia	5	0	1
4/17	212	1	2	0	30	R	Espitia	5	0	1
4/17	362	1	2	0	30	L	Espitia	4	0	1
4/17	625	1	2	0	30	M	Espitia	4	0	1
4/17	825	1	2	0	30	H	Espitia	3	0	1
4/17	636	1	2	0	20	C	Schell	4	3	2
4/17	7	1	2	0	10	C	Schell	2	0	1
4/17	430	1	2	0	30	C	Schell	4	0	1

4/17	501	1	2	0	10	B	Schell	3	0	1
4/17	717	1	2	0	10	R	Schell	3	0	1
4/17	733	1	2	0	10	L	Schell	3	0	1
4/17	260	1	2	0	10	M	Schell	2	0	1
4/17	959	1	2	0	10	H	Schell	2	0	1
4/17	978	1	2	0	20	B	Schell	4	0	1
4/17	500	1	2	0	20	R	Schell	3	4	2
4/17	487	1	2	0	20	L	Schell	3	0	1
4/17	951	1	2	0	20	M	Schell	3	0	1
4/17	195	1	2	0	20	H	Schell	3	0	1
4/17	284	1	2	0	30	B	Schell	5	0	1
4/17	212	1	2	0	30	R	Schell	4	0	1
4/17	362	1	2	0	30	L	Schell	4	0	1
4/17	625	1	2	0	30	M	Schell	4	0	1
4/17	825	1	2	0	30	H	Schell	3	0	1
4/18	327	2	2	1	20	C	Hemphill	3	0	1
4/18	493	2	2	1	10	C	Hemphill	3	0	1
4/18	675	2	2	1	30	C	Hemphill	4	0	1
4/18	81	2	2	1	10	B	Hemphill	3	0	1
4/18	925	2	2	1	10	R	Hemphill	3	0	1
4/18	99	2	2	1	10	L	Hemphill	2.5	0	1
4/18	507	2	2	1	10	M	Hemphill	3	2	2
4/18	144	2	2	1	10	H	Hemphill	2.5	2	2
4/18	856	2	2	1	20	B	Hemphill	3	0	1
4/18	89	2	2	1	20	R	Hemphill	3	0	1
4/18	523	2	2	1	20	L	Hemphill	3	0	1
4/18	596	2	2	1	20	M	Hemphill	3	0	1
4/18	293	2	2	1	20	H	Hemphill	3	0	1
4/18	898	2	2	1	30	B	Hemphill	4	0	1
4/18	637	2	2	1	30	R	Hemphill	4	0	1
4/18	361	2	2	1	30	L	Hemphill	4	0	1
4/18	989	2	2	1	30	M	Hemphill	4	0	1
4/18	0	2	2	1	30	H	Hemphill	2.5	2	2
4/18	327	2	2	1	20	C	Kim	2.5	0	1
4/18	493	2	2	1	10	C	Kim	3	0	1
4/18	675	2	2	1	30	C	Kim	5	0	1
4/18	81	2	2	1	10	B	Kim	3	0	1
4/18	925	2	2	1	10	R	Kim	5.5	0	1
4/18	99	2	2	1	10	L	Kim	1	0	1
4/18	507	2	2	1	10	M	Kim	1	1	2
4/18	144	2	2	1	10	H	Kim	1	0	1
4/18	856	2	2	1	20	B	Kim	4.5	0	1
4/18	89	2	2	1	20	R	Kim	4	0	1
4/18	523	2	2	1	20	L	Kim	3	0	1
4/18	596	2	2	1	20	M	Kim	3	0	1
4/18	293	2	2	1	20	H	Kim	2	0	1
4/18	898	2	2	1	30	B	Kim	6.5	0	1
4/18	637	2	2	1	30	R	Kim	6	0	1
4/18	361	2	2	1	30	L	Kim	6	0	1
4/18	989	2	2	1	30	M	Kim	6.5	0	1
4/18	0	2	2	1	30	H	Kim	8	0	1
4/18	327	2	2	1	20	C	Rhoades	3	0	1
4/18	493	2	2	1	10	C	Rhoades	2	0	1
4/18	675	2	2	1	30	C	Rhoades	4	0	1
4/18	81	2	2	1	10	B	Rhoades	3	0	1
4/18	925	2	2	1	10	R	Rhoades	3	0	1
4/18	99	2	2	1	10	L	Rhoades	2	0	1
4/18	507	2	2	1	10	M	Rhoades	1	0	1
4/18	144	2	2	1	10	H	Rhoades	1	0	1

4/18	856	2	2	1	20	B	Rhoades	4	0	1
4/18	89	2	2	1	20	R	Rhoades	4	0	1
4/18	523	2	2	1	20	L	Rhoades	3	0	1
4/18	596	2	2	1	20	M	Rhoades	3	0	1
4/18	293	2	2	1	20	H	Rhoades	2	0	1
4/18	898	2	2	1	30	B	Rhoades	5	0	1
4/18	637	2	2	1	30	R	Rhoades	5	0	1
4/18	361	2	2	1	30	L	Rhoades	6	0	1
4/18	989	2	2	1	30	M	Rhoades	4	0	1
4/18	0	2	2	1	30	H	Rhoades	2	0	1
4/18	327	2	2	1	20	C	Shin	4	0	1
4/18	493	2	2	1	10	C	Shin	2.5	0	1
4/18	675	2	2	1	30	C	Shin	6	0	1
4/18	81	2	2	1	10	B	Shin	3.5	0	1
4/18	925	2	2	1	10	R	Shin	3.5	0	1
4/18	99	2	2	1	10	L	Shin	1.5	0	1
4/18	507	2	2	1	10	M	Shin	1	0	1
4/18	144	2	2	1	10	H	Shin	1	0	1
4/18	856	2	2	1	20	B	Shin	5	0	1
4/18	89	2	2	1	20	R	Shin	5	0	1
4/18	523	2	2	1	20	L	Shin	3	0	1
4/18	596	2	2	1	20	M	Shin	4.5	0	1
4/18	293	2	2	1	20	H	Shin	2	0	1
4/18	898	2	2	1	30	B	Shin	5	0	1
4/18	637	2	2	1	30	R	Shin	6.5	0	1
4/18	361	2	2	1	30	L	Shin	4.5	0	1
4/18	989	2	2	1	30	M	Shin	4	0	1
4/18	0	2	2	1	30	H	Shin	3.5	0	1
4/18	327	2	2	1	20	C	Espitia	3	0	1
4/18	493	2	2	1	10	C	Espitia	3	0	1
4/18	675	2	2	1	30	C	Espitia	5	0	1
4/18	81	2	2	1	10	B	Espitia	3	0	1
4/18	925	2	2	1	10	R	Espitia	4	0	1
4/18	99	2	2	1	10	L	Espitia	2	0	1
4/18	507	2	2	1	10	M	Espitia	2	0	1
4/18	144	2	2	1	10	H	Espitia	1	0	1
4/18	856	2	2	1	20	B	Espitia	4	0	1
4/18	89	2	2	1	20	R	Espitia	4	0	1
4/18	523	2	2	1	20	L	Espitia	3	0	1
4/18	596	2	2	1	20	M	Espitia	3	0	1
4/18	293	2	2	1	20	H	Espitia	3	0	1
4/18	898	2	2	1	30	B	Espitia	4	0	1
4/18	637	2	2	1	30	R	Espitia	4	0	1
4/18	361	2	2	1	30	L	Espitia	3	0	1
4/18	989	2	2	1	30	M	Espitia	4	0	1
4/18	0	2	2	1	30	H	Espitia	2	0	1
4/18	327	2	2	1	20	C	Schell	2	0	1
4/18	493	2	2	1	10	C	Schell	3	0	1
4/18	675	2	2	1	30	C	Schell	3	0	1
4/18	81	2	2	1	10	B	Schell	2	0	1
4/18	925	2	2	1	10	R	Schell	3	0	1
4/18	99	2	2	1	10	L	Schell	2	0	1
4/18	507	2	2	1	10	M	Schell	1	0	1
4/18	144	2	2	1	10	H	Schell	1	0	1
4/18	856	2	2	1	20	B	Schell	3	2	2
4/18	89	2	2	1	20	R	Schell	3	0	1
4/18	523	2	2	1	20	L	Schell	3	0	1
4/18	596	2	2	1	20	M	Schell	3	2	2
4/18	293	2	2	1	20	H	Schell	2	0	1

4/18	898	2	2	1	30	B	Schell	4	0	1	
4/18	637	2	2	1	30	R	Schell	3	0	1	
4/18	361	2	2	1	30	L	Schell	4	0	1	
4/18	989	2	2	1	30	M	Schell	3	0	1	
4/18	0	2	2	1	30	H	Schell	2	0	1	
4/20	738	3	2	3	20	C	Hemphill	3	0	1	
4/20	171	3	2	3	10	C	Hemphill	3	2.5	2	
4/20	87	3	2	3	30	C	Hemphill	4	3	2	
4/20	225	3	2	3	10	B	Hemphill	3	0	1	
4/20	544	3	2	3	10	R	Hemphill	3	0	1	
4/20	958	3	2	3	10	L	Hemphill	3	0	1	
4/20	899	3	2	3	10	M	Hemphill	2.5	0	1	
4/20	10	3	2	3	10	H	Hemphill	2	0	1	
4/20	22	3	2	3	20	B	Hemphill	4	0	1	
4/20	385	3	2	3	20	R	Hemphill	3	0	1	
4/20	354	3	2	3	20	L	Hemphill	3	2.5	2	
4/20	203	3	2	3	20	M	Hemphill	2.5	2	2	
4/20	770	3	2	3	20	H	Hemphill	3	2	2	
4/20	252	3	2	3	30	B	Hemphill	4	3.5	2	
4/20	315	3	2	3	30	R	Hemphill	4	0	1	
4/20	467	3	2	3	30	L	Hemphill	4	3	2	
4/20	397	3	2	3	30	M	Hemphill	3	2.5	2	
4/20	704	3	2	3	30	H	Hemphill	3	2	2	grayish fat
4/20	738	3	2	3	20	C	Kim	2	0	1	
4/20	171	3	2	3	10	C	Kim	1.5	0	1	
4/20	87	3	2	3	30	C	Kim	3	0	1	
4/20	225	3	2	3	10	B	Kim	2.5	0	1	
4/20	544	3	2	3	10	R	Kim	2	0	1	
4/20	958	3	2	3	10	L	Kim	2	0	1	
4/20	899	3	2	3	10	M	Kim	1	1	2	black discolor
4/20	10	3	2	3	10	H	Kim	1	1	3	black discolor
4/20	22	3	2	3	20	B	Kim	4	0	1	
4/20	385	3	2	3	20	R	Kim	3.5	0	1	
4/20	354	3	2	3	20	L	Kim	3	0	1	
4/20	203	3	2	3	20	M	Kim	1.5	8	2	grayish-red
4/20	770	3	2	3	20	H	Kim	1.5	0	1	
4/20	252	3	2	3	30	B	Kim	4	0	1	
4/20	315	3	2	3	30	R	Kim	4	0	1	
4/20	467	3	2	3	30	L	Kim	3.5	0	1	
4/20	397	3	2	3	30	M	Kim	8	8	2	grayish-red
4/20	704	3	2	3	30	H	Kim	8	8	2	grayish-red
4/20	738	3	2	3	20	C	Rhoades	4	0	1	
4/20	171	3	2	3	10	C	Rhoades	2	0	1	
4/20	87	3	2	3	30	C	Rhoades	4	0	1	
4/20	225	3	2	3	10	B	Rhoades	5	0	1	
4/20	544	3	2	3	10	R	Rhoades	4	0	1	
4/20	958	3	2	3	10	L	Rhoades	2	0	1	
4/20	899	3	2	3	10	M	Rhoades	1	0	1	
4/20	10	3	2	3	10	H	Rhoades	1	0	1	
4/20	22	3	2	3	20	B	Rhoades	5	0	1	
4/20	385	3	2	3	20	R	Rhoades	4	0	1	
4/20	354	3	2	3	20	L	Rhoades	3	0	1	
4/20	203	3	2	3	20	M	Rhoades	3	0	1	
4/20	770	3	2	3	20	H	Rhoades	2	0	1	
4/20	252	3	2	3	30	B	Rhoades	5	0	1	
4/20	315	3	2	3	30	R	Rhoades	5	0	1	
4/20	467	3	2	3	30	L	Rhoades	4	0	1	
4/20	397	3	2	3	30	M	Rhoades	3	0	1	
4/20	704	3	2	3	30	H	Rhoades	4	3	4	

4/20	738	3	2	3	20	C	Shin	3.5	0	1	
4/20	171	3	2	3	10	C	Shin	1.5	0	1	
4/20	87	3	2	3	30	C	Shin	4	0	1	
4/20	225	3	2	3	10	B	Shin	3.5	0	1	
4/20	544	3	2	3	10	R	Shin	3	0	1	
4/20	958	3	2	3	10	L	Shin	3	0	1	
4/20	899	3	2	3	10	M	Shin	1	0	1	
4/20	10	3	2	3	10	H	Shin	1	0	1	
4/20	22	3	2	3	20	B	Shin	4	0	1	
4/20	385	3	2	3	20	R	Shin	4	0	1	
4/20	354	3	2	3	20	L	Shin	3.5	0	1	
4/20	203	3	2	3	20	M	Shin	3	0	1	
4/20	770	3	2	3	20	H	Shin	3	0	1	
4/20	252	3	2	3	30	B	Shin	5.5	0	1	
4/20	315	3	2	3	30	R	Shin	5.5	0	1	
4/20	467	3	2	3	30	L	Shin	5	0	1	
4/20	397	3	2	3	30	M	Shin	3.5	0	1	
4/20	704	3	2	3	30	H	Shin	2.5	0	1	
4/20	738	3	2	3	20	C	Espitia	3	0	1	
4/20	171	3	2	3	10	C	Espitia	2	1	2	
4/20	87	3	2	3	30	C	Espitia	4	0	1	
4/20	225	3	2	3	10	B	Espitia	4	0	1	
4/20	544	3	2	3	10	R	Espitia	4	0	1	
4/20	958	3	2	3	10	L	Espitia	2	0	1	
4/20	899	3	2	3	10	M	Espitia	1	0	1	
4/20	10	3	2	3	10	H	Espitia	1	1	2	black discolor
4/20	22	3	2	3	20	B	Espitia	4	0	1	
4/20	385	3	2	3	20	R	Espitia	4	0	1	
4/20	354	3	2	3	20	L	Espitia	3	0	1	
4/20	203	3	2	3	20	M	Espitia	3	1	2	
4/20	770	3	2	3	20	H	Espitia	1	0	1	
4/20	252	3	2	3	30	B	Espitia	4	0	1	
4/20	315	3	2	3	30	R	Espitia	4	0	1	
4/20	467	3	2	3	30	L	Espitia	4	0	1	
4/20	397	3	2	3	30	M	Espitia	3	0	2	green discolor
4/20	704	3	2	3	30	H	Espitia	2	0	1	
4/20	738	3	2	3	20	C	Schell	2	0	1	
4/20	171	3	2	3	10	C	Schell	2	0	1	
4/20	87	3	2	3	30	C	Schell	3	0	1	
4/20	225	3	2	3	10	B	Schell	3	0	1	
4/20	544	3	2	3	10	R	Schell	3	0	1	
4/20	958	3	2	3	10	L	Schell	1	0	1	
4/20	899	3	2	3	10	M	Schell	1	0	1	
4/20	10	3	2	3	10	H	Schell	1	0	1	
4/20	22	3	2	3	20	B	Schell	4	0	1	
4/20	385	3	2	3	20	R	Schell	4	0	1	
4/20	354	3	2	3	20	L	Schell	3	0	1	
4/20	203	3	2	3	20	M	Schell	2	0	1	
4/20	770	3	2	3	20	H	Schell	2	0	1	
4/20	252	3	2	3	30	B	Schell	4	0	1	
4/20	315	3	2	3	30	R	Schell	4	0	1	very gray
4/20	467	3	2	3	30	L	Schell	3	0	1	
4/20	397	3	2	3	30	M	Schell	3	2	6	
4/20	704	3	2	3	30	H	Schell	2	0	0	dark gray
4/22	515	4	2	5	20	C	Hemphill	3	0	1	
4/22	656	4	2	5	10	C	Hemphill	3	2	5	
4/22	938	4	2	5	30	C	Hemphill	3	0	1	
4/22	734	4	2	5	10	B	Hemphill	3	0	1	
4/22	349	4	2	5	10	R	Hemphill	3	0	1	

4/22	433	4	2	5	10	L	Hemphill	1	0	1	
4/22	617	4	2	5	10	M	Hemphill	2	0	1	
4/22	153	4	2	5	10	H	Hemphill	1.5	0	11	
4/22	909	4	2	5	20	B	Hemphill	3	0	1	
4/22	23	4	2	5	20	R	Hemphill	4	0	1	
4/22	409	4	2	5	20	L	Hemphill	3	2	4	
4/22	14	4	2	5	20	M	Hemphill	2	0	1	
4/22	831	4	2	5	20	H	Hemphill	2	0	1	
4/22	302	4	2	5	30	B	Hemphill	4	0	1	
4/22	582	4	2	5	30	R	Hemphill	4	3	2	
4/22	427	4	2	5	30	L	Hemphill	3.5	2	3	
4/22	998	4	2	5	30	M	Hemphill	2	2.5	2	
4/22	646	4	2	5	30	H	Hemphill	3	3	2	
4/22	515	4	2	5	20	C	Kim	2.5	0	1	
4/22	656	4	2	5	10	C	Kim	1	1	3	grayish-red
4/22	938	4	2	5	30	C	Kim	3	0	1	
4/22	734	4	2	5	10	B	Kim	4	3	2	
4/22	349	4	2	5	10	R	Kim	4	3	2	
4/22	433	4	2	5	10	L	Kim	2	2	2	
4/22	617	4	2	5	10	M	Kim	1	1	2	
4/22	153	4	2	5	10	H	Kim	1	1	2	grayish-red
4/22	909	4	2	5	20	B	Kim	2	0	1	
4/22	23	4	2	5	20	R	Kim	3	0	1	
4/22	409	4	2	5	20	L	Kim	2	2	1	
4/22	14	4	2	5	20	M	Kim	2.5	2.5	2	
4/22	831	4	2	5	20	H	Kim	1	1	2	grayish-red
4/22	302	4	2	5	30	B	Kim	3.5	0	1	
4/22	582	4	2	5	30	R	Kim	3	0	1	
4/22	427	4	2	5	30	L	Kim	8	1	2	grayish-red
4/22	998	4	2	5	30	M	Kim	2.5	1	3	grayish-red
4/22	646	4	2	5	30	H	Kim	1.5	1	5	grayish-red
4/22	515	4	2	5	20	C	Rhoades	3	0	1	
4/22	656	4	2	5	10	C	Rhoades	4	2	5	
4/22	938	4	2	5	30	C	Rhoades	4	0	1	
4/22	734	4	2	5	10	B	Rhoades	4	0	1	
4/22	349	4	2	5	10	R	Rhoades	4	0	1	
4/22	433	4	2	5	10	L	Rhoades	2	0	1	
4/22	617	4	2	5	10	M	Rhoades	2	0	1	
4/22	153	4	2	5	10	H	Rhoades	1	0	1	
4/22	909	4	2	5	20	B	Rhoades	4	0	1	
4/22	23	4	2	5	20	R	Rhoades	4	0	1	
4/22	409	4	2	5	20	L	Rhoades	3	0	1	
4/22	14	4	2	5	20	M	Rhoades	2	0	1	
4/22	831	4	2	5	20	H	Rhoades	1	0	1	
4/22	302	4	2	5	30	B	Rhoades	5	0	1	
4/22	582	4	2	5	30	R	Rhoades	5	0	1	
4/22	427	4	2	5	30	L	Rhoades	4	0	1	fat brown
4/22	998	4	2	5	30	M	Rhoades	4	0	1	fat brown
4/22	646	4	2	5	30	H	Rhoades	1	0	1	very brown
4/22	515	4	2	5	20	C	Shin	3.5	4	2	
4/22	656	4	2	5	10	C	Shin	2	4	2	
4/22	938	4	2	5	30	C	Shin	4.5	0	1	
4/22	734	4	2	5	10	B	Shin	4	0	1	
4/22	349	4	2	5	10	R	Shin	4	0	1	
4/22	433	4	2	5	10	L	Shin	1	3	2	
4/22	617	4	2	5	10	M	Shin	2	3	2	
4/22	153	4	2	5	10	H	Shin	1	2	2	
4/22	909	4	2	5	20	B	Shin	3.5	4	2	
4/22	23	4	2	5	20	R	Shin	4	0	1	

4/22	409	4	2	5	20	L	Shin	2.5	4	2	
4/22	14	4	2	5	20	M	Shin	2	4	2	
4/22	831	4	2	5	20	H	Shin	2	0	1	
4/22	302	4	2	5	30	B	Shin	5	0	1	
4/22	582	4	2	5	30	R	Shin	5	4	2	
4/22	427	4	2	5	30	L	Shin	3.5	4	2	
4/22	998	4	2	5	30	M	Shin	3	4	2	
4/22	646	4	2	5	30	H	Shin	2.5	3	2	
4/22	515	4	2	5	20	C	Espitia	0	0	0	SICK
4/22	656	4	2	5	10	C	Espitia	0	0	0	SICK
4/22	938	4	2	5	30	C	Espitia	0	0	0	SICK
4/22	734	4	2	5	10	B	Espitia	0	0	0	SICK
4/22	349	4	2	5	10	R	Espitia	0	0	0	SICK
4/22	433	4	2	5	10	L	Espitia	0	0	0	SICK
4/22	617	4	2	5	10	M	Espitia	0	0	0	SICK
4/22	153	4	2	5	10	H	Espitia	0	0	0	SICK
4/22	909	4	2	5	20	B	Espitia	0	0	0	SICK
4/22	23	4	2	5	20	R	Espitia	0	0	0	SICK
4/22	409	4	2	5	20	L	Espitia	0	0	0	SICK
4/22	14	4	2	5	20	M	Espitia	0	0	0	SICK
4/22	831	4	2	5	20	H	Espitia	0	0	0	SICK
4/22	302	4	2	5	30	B	Espitia	0	0	0	SICK
4/22	582	4	2	5	30	R	Espitia	0	0	0	SICK
4/22	427	4	2	5	30	L	Espitia	0	0	0	SICK
4/22	998	4	2	5	30	M	Espitia	0	0	0	SICK
4/22	646	4	2	5	30	H	Espitia	0	0	0	SICK
4/22	515	4	2	5	20	C	Schell	3	0	1	
4/22	656	4	2	5	10	C	Schell	1	0	1	
4/22	938	4	2	5	30	C	Schell	3	0	1	
4/22	734	4	2	5	10	B	Schell	3	0	1	
4/22	349	4	2	5	10	R	Schell	3	0	1	
4/22	433	4	2	5	10	L	Schell	1	0	1	
4/22	617	4	2	5	10	M	Schell	1	0	1	
4/22	153	4	2	5	10	H	Schell	1	0	1	
4/22	909	4	2	5	20	B	Schell	3	0	1	
4/22	23	4	2	5	20	R	Schell	4	0	1	
4/22	409	4	2	5	20	L	Schell	2	2	6	gray all over
4/22	14	4	2	5	20	M	Schell	1	0	1	
4/22	831	4	2	5	20	H	Schell	1	0	1	
4/22	302	4	2	5	30	B	Schell	4	0	1	
4/22	582	4	2	5	30	R	Schell	4	0	1	
4/22	427	4	2	5	30	L	Schell	3	1	6	grayish
4/22	998	4	2	5	30	M	Schell	2	0	1	grayish
4/22	646	4	2	5	30	H	Schell	3	0	1	gray all over
4/24	709	1	3	0	10	C	Hemphill	2	0	1	
4/24	73	1	3	0	10	B	Hemphill	3	0	1	
4/24	967	1	3	0	10	R	Hemphill	3	0	1	
4/24	653	1	3	0	10	L	Hemphill	3	0	1	
4/24	570	1	3	0	10	M	Hemphill	3	0	1	
4/24	256	1	3	0	10	H	Hemphill	2	0	1	
4/24	228	1	3	0	20	C	Hemphill	3	0	1	
4/24	880	1	3	0	20	B	Hemphill	4	0	1	
4/24	209	1	3	0	20	R	Hemphill	3.5	0	1	
4/24	538	1	3	0	20	L	Hemphill	4	0	1	
4/24	808	1	3	0	20	M	Hemphill	3	0	1	
4/24	737	1	3	0	20	H	Hemphill	2	0	1	
4/24	587	1	3	0	30	C	Hemphill	5	0	1	
4/24	750	1	3	0	30	B	Hemphill	4.5	0	1	
4/24	37	1	3	0	30	R	Hemphill	3	0	1	

4/24	917	1	3	0	30	L	Hemphill	3	0	1
4/24	400	1	3	0	30	M	Hemphill	4	0	1
4/24	610	1	3	0	30	H	Hemphill	4	0	1
4/24	709	1	3	0	10	C	Kim	1.5	0	1
4/24	73	1	3	0	10	B	Kim	2	0	1
4/24	967	1	3	0	10	R	Kim	2	0	1
4/24	653	1	3	0	10	L	Kim	1.5	0	1
4/24	570	1	3	0	10	M	Kim	2	0	1
4/24	256	1	3	0	10	H	Kim	1.5	0	1
4/24	228	1	3	0	20	C	Kim	3	0	1
4/24	880	1	3	0	20	B	Kim	2.5	0	1
4/24	209	1	3	0	20	R	Kim	2.5	0	1
4/24	538	1	3	0	20	L	Kim	3	0	1
4/24	808	1	3	0	20	M	Kim	3.5	0	1
4/24	737	1	3	0	20	H	Kim	2	0	1
4/24	587	1	3	0	30	C	Kim	2.5	0	1
4/24	750	1	3	0	30	B	Kim	4	0	1
4/24	37	1	3	0	30	R	Kim	4	0	1
4/24	917	1	3	0	30	L	Kim	4	0	1
4/24	400	1	3	0	30	M	Kim	4	0	1
4/24	610	1	3	0	30	H	Kim	2	0	1
4/24	709	1	3	0	10	C	Rhoades	3	0	1
4/24	73	1	3	0	10	B	Rhoades	3	0	1
4/24	967	1	3	0	10	R	Rhoades	4	0	1
4/24	653	1	3	0	10	L	Rhoades	3	0	1
4/24	570	1	3	0	10	M	Rhoades	3	0	1
4/24	256	1	3	0	10	H	Rhoades	2	0	1
4/24	228	1	3	0	20	C	Rhoades	4	0	1
4/24	880	1	3	0	20	B	Rhoades	4	0	1
4/24	209	1	3	0	20	R	Rhoades	4	0	1
4/24	538	1	3	0	20	L	Rhoades	5	0	1
4/24	808	1	3	0	20	M	Rhoades	4	0	1
4/24	737	1	3	0	20	H	Rhoades	2	0	1
4/24	587	1	3	0	30	C	Rhoades	5	0	1
4/24	750	1	3	0	30	B	Rhoades	6	0	1
4/24	37	1	3	0	30	R	Rhoades	6	0	1
4/24	917	1	3	0	30	L	Rhoades	6	0	1
4/24	400	1	3	0	30	M	Rhoades	5	0	1
4/24	610	1	3	0	30	H	Rhoades	4	0	1
4/24	709	1	3	0	10	C	Shin	3.5	0	1
4/24	73	1	3	0	10	B	Shin	3.5	0	1
4/24	967	1	3	0	10	R	Shin	4	0	1
4/24	653	1	3	0	10	L	Shin	3.5	0	1
4/24	570	1	3	0	10	M	Shin	3	0	1
4/24	256	1	3	0	10	H	Shin	1.5	0	1
4/24	228	1	3	0	20	C	Shin	4	0	1
4/24	880	1	3	0	20	B	Shin	4	0	1
4/24	209	1	3	0	20	R	Shin	5	0	1
4/24	538	1	3	0	20	L	Shin	4	0	1
4/24	808	1	3	0	20	M	Shin	4.5	0	1
4/24	737	1	3	0	20	H	Shin	3	0	1
4/24	587	1	3	0	30	C	Shin	6	0	1
4/24	750	1	3	0	30	B	Shin	6	0	1
4/24	37	1	3	0	30	R	Shin	5.5	0	1
4/24	917	1	3	0	30	L	Shin	5.5	0	1
4/24	400	1	3	0	30	M	Shin	5	0	1
4/24	610	1	3	0	30	H	Shin	4.5	0	1
4/24	709	1	3	0	10	C	Espitia	2	0	1
4/24	73	1	3	0	10	B	Espitia	3	0	1

4/24	967	1	3	0	10	R	Espitia	3	0	1
4/24	653	1	3	0	10	L	Espitia	3	0	1
4/24	570	1	3	0	10	M	Espitia	2	0	1
4/24	256	1	3	0	10	H	Espitia	3	0	1
4/24	228	1	3	0	20	C	Espitia	4	0	1
4/24	880	1	3	0	20	B	Espitia	4	0	1
4/24	209	1	3	0	20	R	Espitia	4	0	1
4/24	538	1	3	0	20	L	Espitia	3	0	1
4/24	808	1	3	0	20	M	Espitia	3	0	1
4/24	737	1	3	0	20	H	Espitia	3	0	1
4/24	587	1	3	0	30	C	Espitia	5	0	1
4/24	750	1	3	0	30	B	Espitia	4	0	1
4/24	37	1	3	0	30	R	Espitia	4	0	1
4/24	917	1	3	0	30	L	Espitia	4	0	1
4/24	400	1	3	0	30	M	Espitia	3	0	1
4/24	610	1	3	0	30	H	Espitia	3	0	1
4/24	709	1	3	0	10	C	Schell	2	0	1
4/24	73	1	3	0	10	B	Schell	3	0	1
4/24	967	1	3	0	10	R	Schell	3	0	1
4/24	653	1	3	0	10	L	Schell	3	0	1
4/24	570	1	3	0	10	M	Schell	2	0	1
4/24	256	1	3	0	10	H	Schell	2	0	1
4/24	228	1	3	0	20	C	Schell	3	0	1
4/24	880	1	3	0	20	B	Schell	4	0	1
4/24	209	1	3	0	20	R	Schell	3	2	3
4/24	538	1	3	0	20	L	Schell	4	3	2
4/24	808	1	3	0	20	M	Schell	3	0	1
4/24	737	1	3	0	20	H	Schell	2	0	1
4/24	587	1	3	0	30	C	Schell	5	0	1
4/24	750	1	3	0	30	B	Schell	5	4	2
4/24	37	1	3	0	30	R	Schell	4	0	1
4/24	917	1	3	0	30	L	Schell	4	0	1
4/24	400	1	3	0	30	M	Schell	4	0	1
4/24	610	1	3	0	30	H	Schell	3	0	1
4/25	612	2	3	1	10	C	Hemphill	3	0	1
4/25	45	2	3	1	10	B	Hemphill	3	0	1
4/25	420	2	3	1	10	R	Hemphill	4	0	1
4/25	444	2	3	1	10	L	Hemphill	3	0	1
4/25	287	2	3	1	10	M	Hemphill	3	0	1
4/25	331	2	3	1	10	H	Hemphill	2	0	1
4/25	619	2	3	1	20	C	Hemphill	4	0	1
4/25	337	2	3	1	20	B	Hemphill	4	0	1
4/25	162	2	3	1	20	R	Hemphill	4	0	1
4/25	819	2	3	1	20	L	Hemphill	4	0	1
4/25	266	2	3	1	20	M	Hemphill	3	0	1
4/25	147	2	3	1	20	H	Hemphill	2	0	1
4/25	189	2	3	1	30	C	Hemphill	4	0	1
4/25	785	2	3	1	30	B	Hemphill	4	3	2
4/25	629	2	3	1	30	R	Hemphill	4	0	1
4/25	764	2	3	1	30	L	Hemphill	3.5	0	1
4/25	865	2	3	1	30	M	Hemphill	4	0	1
4/25	701	2	3	1	30	H	Hemphill	2	0	1
4/25	612	2	3	1	10	C	Kim	2	0	1
4/25	45	2	3	1	10	B	Kim	2	0	1
4/25	420	2	3	1	10	R	Kim	1.5	0	1
4/25	444	2	3	1	10	L	Kim	2	0	1
4/25	287	2	3	1	10	M	Kim	1	0	1
4/25	331	2	3	1	10	H	Kim	1.5	0	1
4/25	619	2	3	1	20	C	Kim	2.5	0	1

4/25	337	2	3	1	20	B	Kim	2	0	1	
4/25	162	2	3	1	20	R	Kim	3	0	1	
4/25	819	2	3	1	20	L	Kim	4	0	1	
4/25	266	2	3	1	20	M	Kim	3	0	1	
4/25	147	2	3	1	20	H	Kim	1.5	0	1	
4/25	189	2	3	1	30	C	Kim	3	0	1	
4/25	785	2	3	1	30	B	Kim	3.5	0	1	
4/25	629	2	3	1	30	R	Kim	2.5	0	1	
4/25	764	2	3	1	30	L	Kim	3	0	1	
4/25	865	2	3	1	30	M	Kim	2.5	0	1	
4/25	701	2	3	1	30	H	Kim	2	0	1	
4/25	612	2	3	1	10	C	Rhoades	3	0	1	
4/25	45	2	3	1	10	B	Rhoades	4	0	1	
4/25	420	2	3	1	10	R	Rhoades	3	0	1	
4/25	444	2	3	1	10	L	Rhoades	3	0	1	
4/25	287	2	3	1	10	M	Rhoades	3	0	1	
4/25	331	2	3	1	10	H	Rhoades	2	0	1	
4/25	619	2	3	1	20	C	Rhoades	4	0	1	
4/25	337	2	3	1	20	B	Rhoades	5	0	1	
4/25	162	2	3	1	20	R	Rhoades	4	0	1	
4/25	819	2	3	1	20	L	Rhoades	4	0	1	
4/25	266	2	3	1	20	M	Rhoades	4	0	1	
4/25	147	2	3	1	20	H	Rhoades	2	0	1	
4/25	189	2	3	1	30	C	Rhoades	5	0	1	
4/25	785	2	3	1	30	B	Rhoades	5	0	1	
4/25	629	2	3	1	30	R	Rhoades	5	0	1	
4/25	764	2	3	1	30	L	Rhoades	5	0	1	
4/25	865	2	3	1	30	M	Rhoades	3	0	1	
4/25	701	2	3	1	30	H	Rhoades	2	0	1	
4/25	612	2	3	1	10	C	Shin	3	0	1	
4/25	45	2	3	1	10	B	Shin	3	0	1	
4/25	420	2	3	1	10	R	Shin	3	0	1	
4/25	444	2	3	1	10	L	Shin	3	0	1	
4/25	287	2	3	1	10	M	Shin	2	0	1	
4/25	331	2	3	1	10	H	Shin	2	0	1	
4/25	619	2	3	1	20	C	Shin	3.5	0	1	
4/25	337	2	3	1	20	B	Shin	5	0	1	
4/25	162	2	3	1	20	R	Shin	4	0	1	
4/25	819	2	3	1	20	L	Shin	4	0	1	
4/25	266	2	3	1	20	M	Shin	2	0	1	
4/25	147	2	3	1	20	H	Shin	1.5	0	1	
4/25	189	2	3	1	30	C	Shin	5	0	1	
4/25	785	2	3	1	30	B	Shin	5.5	0	1	
4/25	629	2	3	1	30	R	Shin	5.5	0	1	
4/25	764	2	3	1	30	L	Shin	3.5	0	1	
4/25	865	2	3	1	30	M	Shin	4	0	1	
4/25	701	2	3	1	30	H	Shin	3	0	1	
4/25	612	2	3	1	10	C	Espitia	0	0	0	SICK
4/25	45	2	3	1	10	B	Espitia	0	0	0	SICK
4/25	420	2	3	1	10	R	Espitia	0	0	0	SICK
4/25	444	2	3	1	10	L	Espitia	0	0	0	SICK
4/25	287	2	3	1	10	M	Espitia	0	0	0	SICK
4/25	331	2	3	1	10	H	Espitia	0	0	0	SICK
4/25	619	2	3	1	20	C	Espitia	0	0	0	SICK
4/25	337	2	3	1	20	B	Espitia	0	0	0	SICK
4/25	162	2	3	1	20	R	Espitia	0	0	0	SICK
4/25	819	2	3	1	20	L	Espitia	0	0	0	SICK
4/25	266	2	3	1	20	M	Espitia	0	0	0	SICK
4/25	147	2	3	1	20	H	Espitia	0	0	0	SICK

4/25	189	2	3	1	30	C	Espitia	0	0	0	SICK
4/25	785	2	3	1	30	B	Espitia	0	0	0	SICK
4/25	629	2	3	1	30	R	Espitia	0	0	0	SICK
4/25	764	2	3	1	30	L	Espitia	0	0	0	SICK
4/25	865	2	3	1	30	M	Espitia	0	0	0	SICK
4/25	701	2	3	1	30	H	Espitia	0	0	0	SICK
4/25	612	2	3	1	10	C	Schell	3	0	1	
4/25	45	2	3	1	10	B	Schell	3	0	1	
4/25	420	2	3	1	10	R	Schell	3	0	1	
4/25	444	2	3	1	10	L	Schell	2	0	1	
4/25	287	2	3	1	10	M	Schell	2	0	1	
4/25	331	2	3	1	10	H	Schell	1	0	1	
4/25	619	2	3	1	20	C	Schell	3	0	1	
4/25	337	2	3	1	20	B	Schell	4	0	1	
4/25	162	2	3	1	20	R	Schell	4	0	1	
4/25	819	2	3	1	20	L	Schell	3	0	1	
4/25	266	2	3	1	20	M	Schell	2	0	1	
4/25	147	2	3	1	20	H	Schell	2	0	1	
4/25	189	2	3	1	30	C	Schell	4	3	2	
4/25	785	2	3	1	30	B	Schell	4	0	1	
4/25	629	2	3	1	30	R	Schell	4	0	1	
4/25	764	2	3	1	30	L	Schell	4	0	1	
4/25	865	2	3	1	30	M	Schell	3	0	1	
4/25	701	2	3	1	30	H	Schell	2	0	1	
4/27	980	3	3	3	10	C	Hemphill	3	0	1	
4/27	60	3	3	3	10	B	Hemphill	4	0	1	
4/27	426	3	3	3	10	R	Hemphill	4	0	1	
4/27	581	3	3	3	10	L	Hemphill	3	0	1	
4/27	519	3	3	3	10	M	Hemphill	2.5	0	1	
4/27	356	3	3	3	10	H	Hemphill	2	0	1	
4/27	885	3	3	3	20	C	Hemphill	3.5	3	2	
4/27	221	3	3	3	20	B	Hemphill	3	0	1	
4/27	664	3	3	3	20	R	Hemphill	3	0	1	
4/27	545	3	3	3	20	L	Hemphill	3	0	1	
4/27	18	3	3	3	20	M	Hemphill	2	0	1	
4/27	187	3	3	3	20	H	Hemphill	1	0	1	
4/27	68	3	3	3	30	C	Hemphill	4	0	1	
4/27	572	3	3	3	30	B	Hemphill	4	0	1	
4/27	11	3	3	3	30	R	Hemphill	4	0	1	
4/27	994	3	3	3	30	L	Hemphill	3	0	1	
4/27	44	3	3	3	30	M	Hemphill	2	0	1	
4/27	689	3	3	3	30	H	Hemphill	1	0	1	
4/27	980	3	3	3	10	C	Kim	0	0	0	N/A
4/27	60	3	3	3	10	B	Kim	0	0	0	N/A
4/27	426	3	3	3	10	R	Kim	0	0	0	N/A
4/27	581	3	3	3	10	L	Kim	0	0	0	N/A
4/27	519	3	3	3	10	M	Kim	0	0	0	N/A
4/27	356	3	3	3	10	H	Kim	0	0	0	N/A
4/27	885	3	3	3	20	C	Kim	0	0	0	N/A
4/27	221	3	3	3	20	B	Kim	0	0	0	N/A
4/27	664	3	3	3	20	R	Kim	0	0	0	N/A
4/27	545	3	3	3	20	L	Kim	0	0	0	N/A
4/27	18	3	3	3	20	M	Kim	0	0	0	N/A
4/27	187	3	3	3	20	H	Kim	0	0	0	N/A
4/27	68	3	3	3	30	C	Kim	0	0	0	N/A
4/27	572	3	3	3	30	B	Kim	0	0	0	N/A
4/27	11	3	3	3	30	R	Kim	0	0	0	N/A
4/27	994	3	3	3	30	L	Kim	0	0	0	N/A
4/27	44	3	3	3	30	M	Kim	0	0	0	N/A

4/27	689	3	3	3	30	H	Kim	0	0	0	N/A
4/27	980	3	3	3	10	C	Rhoades	3	0	1	
4/27	60	3	3	3	10	B	Rhoades	3	0	1	
4/27	426	3	3	3	10	R	Rhoades	3	0	1	
4/27	581	3	3	3	10	L	Rhoades	3	0	1	
4/27	519	3	3	3	10	M	Rhoades	3	0	1	
4/27	356	3	3	3	10	H	Rhoades	1	0	1	
4/27	885	3	3	3	20	C	Rhoades	3	0	1	
4/27	221	3	3	3	20	B	Rhoades	4	0	1	
4/27	664	3	3	3	20	R	Rhoades	4	0	1	
4/27	545	3	3	3	20	L	Rhoades	4	0	1	
4/27	18	3	3	3	20	M	Rhoades	3	0	1	
4/27	187	3	3	3	20	H	Rhoades	2	0	1	
4/27	68	3	3	3	30	C	Rhoades	4	0	1	
4/27	572	3	3	3	30	B	Rhoades	5	0	1	
4/27	11	3	3	3	30	R	Rhoades	5	0	1	
4/27	994	3	3	3	30	L	Rhoades	4	0	1	
4/27	44	3	3	3	30	M	Rhoades	3	0	1	brown fat
4/27	689	3	3	3	30	H	Rhoades	3	0	1	brown fat
4/27	980	3	3	3	10	C	Shin	0	0	0	SICK
4/27	60	3	3	3	10	B	Shin	0	0	0	SICK
4/27	426	3	3	3	10	R	Shin	0	0	0	SICK
4/27	581	3	3	3	10	L	Shin	0	0	0	SICK
4/27	519	3	3	3	10	M	Shin	0	0	0	SICK
4/27	356	3	3	3	10	H	Shin	0	0	0	SICK
4/27	885	3	3	3	20	C	Shin	0	0	0	SICK
4/27	221	3	3	3	20	B	Shin	0	0	0	SICK
4/27	664	3	3	3	20	R	Shin	0	0	0	SICK
4/27	545	3	3	3	20	L	Shin	0	0	0	SICK
4/27	18	3	3	3	20	M	Shin	0	0	0	SICK
4/27	187	3	3	3	20	H	Shin	0	0	0	SICK
4/27	68	3	3	3	30	C	Shin	0	0	0	SICK
4/27	572	3	3	3	30	B	Shin	0	0	0	SICK
4/27	11	3	3	3	30	R	Shin	0	0	0	SICK
4/27	994	3	3	3	30	L	Shin	0	0	0	SICK
4/27	44	3	3	3	30	M	Shin	0	0	0	SICK
4/27	689	3	3	3	30	H	Shin	0	0	0	SICK
4/27	980	3	3	3	10	C	Espitia	3	0	1	
4/27	60	3	3	3	10	B	Espitia	3	0	1	
4/27	426	3	3	3	10	R	Espitia	3	0	1	
4/27	581	3	3	3	10	L	Espitia	3	0	1	
4/27	519	3	3	3	10	M	Espitia	2	2	1	
4/27	356	3	3	3	10	H	Espitia	1	0	1	
4/27	885	3	3	3	20	C	Espitia	4	2	2	
4/27	221	3	3	3	20	B	Espitia	3	0	1	
4/27	664	3	3	3	20	R	Espitia	4	0	1	
4/27	545	3	3	3	20	L	Espitia	3	0	1	
4/27	18	3	3	3	20	M	Espitia	2	0	1	
4/27	187	3	3	3	20	H	Espitia	1	2	2	
4/27	68	3	3	3	30	C	Espitia	4	2	2	
4/27	572	3	3	3	30	B	Espitia	4	0	1	
4/27	11	3	3	3	30	R	Espitia	5	0	1	
4/27	994	3	3	3	30	L	Espitia	3	0	1	
4/27	44	3	3	3	30	M	Espitia	2	0	1	
4/27	689	3	3	3	30	H	Espitia	1	0	1	
4/27	980	3	3	3	10	C	Schell	3	0	1	
4/27	60	3	3	3	10	B	Schell	3	0	1	
4/27	426	3	3	3	10	R	Schell	2	0	1	
4/27	581	3	3	3	10	L	Schell	2	0	1	

4/27	519	3	3	3	10	M	Schell	1	0	1	
4/27	356	3	3	3	10	H	Schell	1	0	1	
4/27	885	3	3	3	20	C	Schell	4	2	6	
4/27	221	3	3	3	20	B	Schell	3	0	1	
4/27	664	3	3	3	20	R	Schell	4	0	1	
4/27	545	3	3	3	20	L	Schell	3	0	1	
4/27	18	3	3	3	20	M	Schell	3	0	1	
4/27	187	3	3	3	20	H	Schell	1	0	1	slightly gray
4/27	68	3	3	3	30	C	Schell	4	2	2	
4/27	572	3	3	3	30	B	Schell	3	0	1	
4/27	11	3	3	3	30	R	Schell	4	0	1	
4/27	994	3	3	3	30	L	Schell	3	0	1	
4/27	44	3	3	3	30	M	Schell	3	2	6	gray
4/27	689	3	3	3	30	H	Schell	2	0	1	gray all over
4/29	199	4	3	5	10	C	Hemphill	3	2	6	
4/29	219	4	3	5	10	B	Hemphill	3	2	6	
4/29	474	4	3	5	10	R	Hemphill	3	1	2	
4/29	151	4	3	5	10	L	Hemphill	3	2	4	
4/29	428	4	3	5	10	M	Hemphill	3	1	4	
4/29	588	4	3	5	10	H	Hemphill	2	0	1	
4/29	192	4	3	5	20	C	Hemphill	2	2	5	
4/29	182	4	3	5	20	B	Hemphill	3	2	5	
4/29	577	4	3	5	20	R	Hemphill	3	1	5	
4/29	874	4	3	5	20	L	Hemphill	3	1	5	
4/29	902	4	3	5	20	M	Hemphill	3	2	6	
4/29	217	4	3	5	20	H	Hemphill	2	2	4	
4/29	496	4	3	5	30	C	Hemphill	4	2	2	
4/29	780	4	3	5	30	B	Hemphill	5	2	4	
4/29	685	4	3	5	30	R	Hemphill	2	2	3	
4/29	966	4	3	5	30	L	Hemphill	2	2	5	
4/29	235	4	3	5	30	M	Hemphill	2	1	5	
4/29	705	4	3	5	30	H	Hemphill	1	0	1	
4/29	199	4	3	5	10	C	Kim	2	3	2	
4/29	219	4	3	5	10	B	Kim	2	3	2	
4/29	474	4	3	5	10	R	Kim	3.5	2	2	
4/29	151	4	3	5	10	L	Kim	1.5	2	1.5	
4/29	428	4	3	5	10	M	Kim	1	2	1	
4/29	588	4	3	5	10	H	Kim	1.5	4	1	
4/29	192	4	3	5	20	C	Kim	2	3	2	
4/29	182	4	3	5	20	B	Kim	3.5	1	0	
4/29	577	4	3	5	20	R	Kim	2.5	3	2	
4/29	874	4	3	5	20	L	Kim	2.5	2	3	
4/29	902	4	3	5	20	M	Kim	2.5	2	2	
4/29	217	4	3	5	20	H	Kim	2.5	2	2	
4/29	496	4	3	5	30	C	Kim	3	2	3	
4/29	780	4	3	5	30	B	Kim	6	1	0	
4/29	685	4	3	5	30	R	Kim	7	2	3	
4/29	966	4	3	5	30	L	Kim	6	1	0	
4/29	235	4	3	5	30	M	Kim	1.5	6	1.5	
4/29	705	4	3	5	30	H	Kim	1.5	6	1.5	
4/29	199	4	3	5	10	C	Rhoades	3	0	1	
4/29	219	4	3	5	10	B	Rhoades	1	0	1	
4/29	474	4	3	5	10	R	Rhoades	3	0	1	
4/29	151	4	3	5	10	L	Rhoades	3	0	1	
4/29	428	4	3	5	10	M	Rhoades	3	0	1	
4/29	588	4	3	5	10	H	Rhoades	1	0	1	
4/29	192	4	3	5	20	C	Rhoades	3	0	1	
4/29	182	4	3	5	20	B	Rhoades	4	0	1	
4/29	577	4	3	5	20	R	Rhoades	2	0	1	

4/29	874	4	3	5	20	L	Rhoades	2	0	1	
4/29	902	4	3	5	20	M	Rhoades	3	0	1	
4/29	217	4	3	5	20	H	Rhoades	2	0	1	
4/29	496	4	3	5	30	C	Rhoades	4	0	1	
4/29	780	4	3	5	30	B	Rhoades	5	0	1	
4/29	685	4	3	5	30	R	Rhoades	4	0	1	brown fat
4/29	966	4	3	5	30	L	Rhoades	5	0	1	
4/29	235	4	3	5	30	M	Rhoades	1	0	1	brown fat
4/29	705	4	3	5	30	H	Rhoades	1	0	1	brown fat
4/29	199	4	3	5	10	C	Shin	1	4	2	
4/29	219	4	3	5	10	B	Shin	1.5	1	3	
4/29	474	4	3	5	10	R	Shin	2	0	1	
4/29	151	4	3	5	10	L	Shin	2	0	1	
4/29	428	4	3	5	10	M	Shin	1.5	0	1	
4/29	588	4	3	5	10	H	Shin	1	0	1	
4/29	192	4	3	5	20	C	Shin	2	4	2	
4/29	182	4	3	5	20	B	Shin	4	0	1	
4/29	577	4	3	5	20	R	Shin	2.5	0	1	
4/29	874	4	3	5	20	L	Shin	2.5	0	1	
4/29	902	4	3	5	20	M	Shin	3	3	2	
4/29	217	4	3	5	20	H	Shin	1	3	2	
4/29	496	4	3	5	30	C	Shin	3	4	2	
4/29	780	4	3	5	30	B	Shin	3.5	0	1	
4/29	685	4	3	5	30	R	Shin	3.5	4	2	
4/29	966	4	3	5	30	L	Shin	3	3	2	
4/29	235	4	3	5	30	M	Shin	3	3	2	
4/29	705	4	3	5	30	H	Shin	2.5	3	2	
4/29	199	4	3	5	10	C	Espitia	3	1	6	
4/29	219	4	3	5	10	B	Espitia	3	1	6	
4/29	474	4	3	5	10	R	Espitia	3	0	1	
4/29	151	4	3	5	10	L	Espitia	4	2	6	
4/29	428	4	3	5	10	M	Espitia	4	1	6	
4/29	588	4	3	5	10	H	Espitia	1	0	1	
4/29	192	4	3	5	20	C	Espitia	3	1	6	
4/29	182	4	3	5	20	B	Espitia	4	2	5	
4/29	577	4	3	5	20	R	Espitia	3	1	6	
4/29	874	4	3	5	20	L	Espitia	4	1	6	
4/29	902	4	3	5	20	M	Espitia	3	2	6	
4/29	217	4	3	5	20	H	Espitia	3	1	6	
4/29	496	4	3	5	30	C	Espitia	3	1	3	
4/29	780	4	3	5	30	B	Espitia	5	0	1	
4/29	685	4	3	5	30	R	Espitia	3	2	5	
4/29	966	4	3	5	30	L	Espitia	3	2	3	
4/29	235	4	3	5	30	M	Espitia	3	1	6	
4/29	705	4	3	5	30	H	Espitia	1	0	1	
4/29	199	4	3	5	10	C	Schell	1	0	0	
4/29	219	4	3	5	10	B	Schell	1	1	7	gray all over
4/29	474	4	3	5	10	R	Schell	3	0	1	
4/29	151	4	3	5	10	L	Schell	1	0	1	
4/29	428	4	3	5	10	M	Schell	1	0	1	
4/29	588	4	3	5	10	H	Schell	1	0	1	
4/29	192	4	3	5	20	C	Schell	1	1	2	slight gray
4/29	182	4	3	5	20	B	Schell	3	0	1	
4/29	577	4	3	5	20	R	Schell	2	0	1	
4/29	874	4	3	5	20	L	Schell	1	1	7	gray all over
4/29	902	4	3	5	20	M	Schell	2	0	1	
4/29	217	4	3	5	20	H	Schell	1	1	7	gray all over
4/29	496	4	3	5	30	C	Schell	2	0	1	
4/29	780	4	3	5	30	B	Schell	4	0	1	

4/29	685	4	3	5	30	R	Schell	2	0	1	
4/29	966	4	3	5	30	L	Schell	3	0	1	
4/29	235	4	3	5	30	M	Schell	1	1	7	gray all over
4/29	705	4	3	5	30	H	Schell	1	1	7	gray all over

COOKING RECORD

Date	Session	S3D	Order	Rep	Day	Trt	Fat	Patty	Time On	Time Off	Temp On	Temp Off	Raw Wt.	Ckd Wt.
4/10	1	056	1	1	1	L	20	1	949	1007	8.6	75	199.4	140
4/10	1	771	2	1	1	B	10	1	950	1010	7.2	75	200.4	139.3
4/10	1	257	3	1	1	R	30	1	955	1017	9.3	73	197.6	121.4
4/10	1	140	4	1	1	C	10	1						
4/10	1	262	5	1	1	R	10	1	952	1012	7.8	75	196.8	146.7
4/10	1	393	6	1	1	H	30	1	953	1015	7.7	73	199	129.7
4/10	2	578	7	1	1	R	20	1	1045	1108	12.8	73	199.1	149.6
4/10	2	568	8	1	1	L	30	1	1045	1110	11.2	73	198.5	133.6
4/10	2	273	9	1	1	H	10	1	1046	1109	10.9	73	197.7	154.6
4/10	2	766	10	1	1	B	30	1	1047	1116	10.4	73	198.5	124.7
4/10	2	996	11	1	1	H	20	1	1048	1111	11.2	73.4	199.4	146.4
4/10	2	749	12	1	1	C	30	1	1049	1105	11.3	73	199	144.7
4/10	3	799	13	1	1	M	20	1	1133	1207	11.1	75.8	198.7	
4/10	3	071	14	1	1	M	30	1	1134	1205	10.9	74.3	197.9	120.9
4/10	3	914	15	1	1	B	20	1	1143	1218	12.2	75.2	199	129.7
4/10	3	813	16	1	1	C	20	1	1147	1220	12.1	74.1	196.3	139.2
4/10	3	312	17	1	1	M	10	1	1209	1235	12.3	75.3	197.9	150.6
4/10	3	517	18	1	1	L	10	1	1209	1232	13	77.6	199.2	152.1
4/10	1	056	1	1	1	L	20	2	948	1007	8.6	75	199.4	145.5
4/10	1	771	2	1	1	B	10	2	950	1010	8.5	75	200	143.3
4/10	1	257	3	1	1	R	30	2	955	1017	9.7	73	197.6	121.4
4/10	1	140	4	1	1	C	10	2	945	1005	8.5	75	198.7	
4/10	1	262	5	1	1	R	10	2	952	1014	7.1	75	198.7	150.4
4/10	1	393	6	1	1	H	30	2	953	1015	8.5	73	199.2	128.6
4/10	2	578	7	1	1	R	20	2	1045	1112	10.7	73	200.1	139.4
4/10	2	568	8	1	1	L	30	2	1045	1111	10.7	73	197.4	129.9
4/10	2	273	9	1	1	H	10	2	1046	1110	10.2	73	198.5	157.5
4/10	2	766	10	1	1	B	30	2	1047	1110	10.2	73	198.7	128.8
4/10	2	996	11	1	1	H	20	2	1048	1119	10.4	73.5	199.2	144.3
4/10	2	749	12	1	1	C	30	2	1049	1110	10.2	73.1	198.9	137.4
4/10	3	799	13	1	1	M	20	2	1133	1204	11.3	74.2	199.1	137.8
4/10	3	071	14	1	1	M	30	2	1134	1205	11.3	73.8	198.9	124.4
4/10	3	914	15	1	1	B	20	2	1143	1219	12.2	75.8	199.1	129.6
4/10	3	813	16	1	1	C	20	2	1147	1221	11.8	73	197.5	142.8
4/10	3	312	17	1	1	M	10	2	1209	1236	11.3	75.4	197.4	143.7
4/10	3	517	18	1	1	L	10	2	1209	1233	12.8	74.5	198.7	153.6
4/14	1	741	1	1	5	H	20	1	919	945	10	73	198.9	142.2
4/14	1	866	2	1	5	C	10	1	923	946	4	73.4	196.1	145.7

4/14	1	301	3	1	5	L	10	1	928	951	5.7	73	196.1	148.8
4/14	1	242	4	1	5	L	20	1	948	1010	8.8	73.1	197.7	137.7
4/14	1	338	5	1	5	B	30	1	949	1019	10.6	73	196.9	123.4
4/14	1	292	6	1	5	M	10	1	954	1023	10.1	73.1	195.6	141.5
4/14	2	855	7	1	5	C	20	1	1018	1030	8.8	73	197.6	157
4/14	2	139	8	1	5	B	20	1	1020	1047	9.3	73.2	197.7	132.5
4/14	2	747	9	1	5	R	20	1	1032	1051	10.2	73	197.1	143.2
4/14	2	620	10	1	5	M	30	1	1047	1112	10.9	73	196.5	121.3
4/14	2	697	11	1	5	M	20	1	1048	1112	12.1	73	196.3	138.2
4/14	2	093	12	1	5	B	10	1	1053	1111	11.7	73.4	192.9	151.2
4/14	3	743	13	1	5	H	10	1	1105	1132	6.6	73	195	149.8
4/14	3	445	14	1	5	R	30	1						
4/14	3	095	15	1	5	R	10	1	1121	1138	7.3	73	196	148.4
4/14	3	198	16	1	5	L	30	1	1121	1152	9.4	74.5	196.5	123.9
4/14	3	987	17	1	5	C	30	1	1142	1205	10.7	73	197.9	123
4/14	3	227	18	1	5	H	30	1	1143	1220	12.6	76.8	195.7	115.2
4/14	1	741	1	1	5	H	20	2	919	946	9.7	73.3	198.7	139.1
4/14	1	866	2	1	5	C	10	2	923	945	4.2	73.1	196.4	147.8
4/14	1	301	3	1	5	L	10	2	928	947	4.8	74.1	196.3	147.1
4/14	1	242	4	1	5	L	20	2	948	1012	8.2	73.1	197.4	134.8
4/14	1	338	5	1	5	B	30	2	949	1017	9.5	73.5	198	120.2
4/14	1	292	6	1	5	M	10	2	957	1022	10.2	73.4	195.3	143.9
4/14	2	855	7	1	5	C	20	2	1018	1031	9.2	73	197.6	149.5
4/14	2	139	8	1	5	B	20	2	1020	1046	8.8	73	196.9	133.7
4/14	2	747	9	1	5	R	20	2	1032	1053	11.1	73	197.6	137.4
4/14	2	620	10	1	5	M	30	2	1047	1107	12.3	73	196.6	129.5
4/14	2	697	11	1	5	M	20	2	1048	1110	11.6	74.1	197.6	144.4
4/14	2	093	12	1	5	B	10	2	1054	1115	11.2	73	195.4	147.3
4/14	3	743	13	1	5	H	10	2	1106	1140	3.2	73.4	196.1	149.9
4/14	3	445	14	1	5	R	30	2	1113	1140	7.1	73	196.1	149.3
4/14	3	095	15	1	5	R	10	2						
4/14	3	198	16	1	5	L	30	2	1122	1152	8.3	73	196.9	121
4/14	3	987	17	1	5	C	30	2	1142	1206	10.3	74.5	197.5	122
4/14	3	227	18	1	5	H	30	2	1143	1210	13	74	197.4	116
4/17	1	407	1	2	1	C	10	1	927	942	29.8	74.5	198	147
4/17	1	484	2	2	1	b	30	1	927	955	5	73	199	119.5
4/17	1	357	3	2	1	h	10	1	948	1014	8.7	74	199.5	144.2
4/17	1	929	4	2	1	m	30	1	956	1019	9.3	73	199.6	125.2
4/17	1	475	5	2	1	m	20	1	1006	1027	11.6	73	199.4	134.2
4/17	1	176	6	2	1	r	30	1	1020	1040	14	73	199.4	121.6
4/17	2	802	7	2	1	m	30	1	1023	1042	5.1	73.1	199.2	130

4/17	2	823	8	2	1	l	30	1	1025	1045	3.8	73.4	198.9	122.2
4/17	2	222	9	2	1	h	20	1	1030	1051	9	73	199.5	135.9
4/17	2	174	10	2	1	c	20	1	1047	1105	8	73.7	199	133.7
4/17	2	908	11	2	1	m	10	1	1052	1112	8.6	73	198.3	156.4
4/17	2	288	12	2	1	l	20	1	1055	1114	12	73.6	199.7	140.2
4/17	3	530	13	2	1	b	20	1	1101	1128	7.2	73	201.2	137.8
4/17	3	272	14	2	1	r	10	1	1111	1133	8.2	73.3	199	146.6
4/17	3	469	15	2	1	c	30	1	1115	1136	8.8	73	198.6	124.2
4/17	3	358	16	2	1	l	10	1	1116	1140	9.8	73.2	198.7	145.7
4/17	3	714	17	2	1	r	20	1	1129	1149	9.5	73	199.4	139.3
4/17	3	237	18	2	1	b	10	1	1138	1157	13	74.5	199.5	144.3
4/17	1	407	1	2	1	C	10	2	927	946	28.4	73	199.3	151.3
4/17	1	484	2	2	1	b	30	2	927	955	4.7	73	199	119
4/17	1	357	3	2	1	h	10	2	948	1013	10.8	73	199.7	155.1
4/17	1	929	4	2	1	m	30	2	957	1020	8.6	73.2	199.3	124.2
4/17	1	475	5	2	1	m	20	2	1007	1026	10	73.3	198.4	138.7
4/17	1	176	6	2	1	r	30	2	1021	1039	12.6	72	198.8	124.3
4/17	2	802	7	2	1	m	30	2	1023	1043	4.6	73.1	198.6	127.7
4/17	2	823	8	2	1	l	30	2	1026	1048	4.6	73	199.6	123.6
4/17	2	222	9	2	1	h	20	2	1030	1051	6.7	74	198.8	139.7
4/17	2	174	10	2	1	c	20	2	1049	1106	11.4	72.8	199.9	135.8
4/17	2	908	11	2	1	m	10	2	1052	1112	10.9	73	199.3	157.3
4/17	2	288	12	2	1	l	20	2	1055	1111	9.4	73	200.2	146.5
4/17	3	530	13	2	1	b	20	2	1102	1128	7.3	73	199.5	138.1
4/17	3	272	14	2	1	r	10	2	1111	1130	7.9	73.8	199.3	153.5
4/17	3	469	15	2	1	c	30	2	1115	1137	7.7	73.7	198.8	120.7
4/17	3	358	16	2	1	l	10	2	1116	1140	9.3	74.5	200	144.8
4/17	3	714	17	2	1	r	20	2	1129	1146	8.8	74.2	199.1	146.6
4/17	3	237	18	2	1	b	10	2	1138	1156	12.4	73.8	199.2	146.9
4/21	1	851	1	2	5	c	30	1	918	934	6	73.4	198.4	130.1
4/21	1	594	2	2	5	m	30	1	921	948	2.7	73.5	197.6	125.6
4/21	1	522	3	2	5	c	10	1	932	952	5.6	74.1	197	150.1
4/21	1	567	4	2	5	h	20	1	939	1003	4.8	74	196.5	139.7
4/21	1	801	5	2	5	h	10	1	943	1000	7.4	73.4	198.4	162.5
4/21	1	836	6	2	5	r	30	1	953	1007	9.3	73.2	197.9	133.9
4/21	2	807	7	2	5	c	20	1		1039	6.1	73.4	196.8	140.4
4/21	2	976	8	2	5	r	10	1	1025	1050	5.7	73	197.5	149.3
4/21	2	137	9	2	5	h	30	1	1030	1053	6.1	73.5	198.4	127.7
4/21	2	904	10	2	5	r	20	1	1032	1107	5.9	73.4	196.2	133.8
4/21	2	146	11	2	5	m	20	1	1042	1109	9.4	73.2	197.7	133.5
4/21	2	774	12	2	5	b	20	1	1052	1116	11.4	73.5	197.3	135.6

4/21	3	512	13	2	5	b	10	1	1112	1137	5.8	73.4	197.1	146.5
4/21	3	906	14	2	5	m	10	1	1119	1139	5.3	73.2	197.7	151.5
4/21	3	289	15	2	5	l	10	1	1124	1143	7	73.2	196.7	154.2
4/21	3	436	16	2	5	l	30	1	1136	1200	7	73	196.6	119.4
4/21	3	226	17	2	5	l	20	1	1142	1202	5.5	73	165.6	139.9
4/21	3	859	18	2	5	b	30	1	1148	1211	8.4	73.1	196.7	123
4/21	1	851	1	2	5	c	30	2	918	935	3.7	73.4	198.2	131.1
4/21	1	594	2	2	5	m	30	2	921	947	2.5	73	198	126.5
4/21	1	522	3	2	5	c	10	2	932	949	4.6	73.1	197.4	154.8
4/21	1	567	4	2	5	h	20	2	939	1003	4.5	73.4	197.1	138.3
4/21	1	801	5	2	5	h	10	2	943	1004	6.1	73.2	196.8	156.8
4/21	1	836	6	2	5	r	30	2	953	1008	9	73	197.3	135.1
4/21	2	807	7	2	5	c	20	2		1040	6.8	74	196.1	137.9
4/21	2	976	8	2	5	r	10	2	1025	1051	5.1	73.1	197.8	142.8
4/21	2	137	9	2	5	h	30	2	1030	1053	5.6	73.4	197.1	129.2
4/21	2	904	10	2	5	r	20	2	1032	1107	6.7	73.5	197	132.8
4/21	2	146	11	2	5	m	20	2	1042	1109	10.2	73.4	198	136.1
4/21	2	774	12	2	5	b	20	2	1052	1115	11.9	74	196.7	131.7
4/21	3	512	13	2	5	b	10	2	1112	1137	5.9	73.3	197.2	146.5
4/21	3	906	14	2	5	m	10	2	1119	1139	5.6	73.1	197.4	153.3
4/21	3	289	15	2	5	l	10	2	1124	1143	7.1	73.2	197.4	157.7
4/21	3	436	16	2	5	l	30	2	1136	1200	6	73.1	196.6	121.2
4/21	3	226	17	2	5	l	20	2	1142	1201	5.3	73.1	195.8	141.9
4/21	3	859	18	2	5	b	30	2	1148	1211	8.3	73.1	196.4	124.4
4/24	1	025	1	3	1	c	10	1	925	949	5	73.7	199	144.8
4/24	1	562	2	3	1	r	30	1	935	958	4	73.4	198.7	114.2
4/24	1	313	3	3	1	l	30	1	956	1020	8.3	74.6	199.7	125.1
4/24	1	102	4	3	1	b	20	1	1000	1027	9	73.2	199.5	135.4
4/24	1	790	5	3	1	r	20	1	1024	1041	10.3	74.5	199.9	142.4
4/24	1	608	6	3	1	b	10	1	1031	1049	10.5	74.5	198.9	147
4/24	2	021	7	3	1	h	10	1	1043	1101	6.3	73.6	200.1	159.5
4/24	2	827	8	3	1	m	30	1	1050	1110	9.1	73.4	199.3	116
4/24	2	584	9	3	1	m	10	1	1053	1117	6.5	73	200.1	138.5
4/24	2	462	10	3	1	c	20	1	1104	1126	5.3	74.6	199.2	127
4/24	2	956	11	3	1	c	30	1	1111	1134	5.4	74	199.6	117
4/24	2	164	12	3	1	h	20	1	1116	1139	7.6	73	199.7	135.7
4/24	3	658	13	3	1	l	10	1	1124	1143	3.8	73.2	199.3	151.2
4/24	3	346	14	3	1	l	20	1	1131	1152	5	74.8	199.3	139.1
4/24	3	788	15	3	1	m	20	1	1141	1202	7.6	75.3	198.1	130.1

4/24	3	739	16	3	1	h	30	1	1150	1208	4.8	73.4	199.5	127.4
4/24	3	450	17	3	1	r	10	1	1156	1216	4	75	199.4	148.9
4/24	3	160	18	3	1	b	30	1	1200	1223	5.2	73.7	198.6	114.4
4/24	1	025	1	3	1	c	10	2	925	952	4.7	73	198.5	140.8
4/24	1	562	2	3	1	r	30	2	935	958	4.5	73	199.5	117.2
4/24	1	313	3	3	1	l	30	2	956		7.7	73	199.6	123.1
4/24	1	102	4	3	1	b	20	2	1000	1029	8.1	73	198.7	127.4
4/24	1	790	5	3	1	r	20	2	1024	1042	10.8	73.5	200.1	135.7
4/24	1	608	6	3	1	b	10	2	1031	1049	12.7	75	199.8	149.5
4/24	2	021	7	3	1	h	10	2	1043	1101	6.8	74	199.7	156.7
4/24	2	827	8	3	1	m	30	2	1050	1108	9.2	73	199.4	124
4/24	2	584	9	3	1	m	10	2	1053	1117	6.9	73	199.5	143.8
4/24	2	462	10	3	1	c	20	2	1104	1127	4.8	73.8	199.2	122.7
4/24	2	956	11	3	1	c	30	2	1112	1133	6	73	198.9	113.6
4/24	2	164	12	3	1	h	20	2	1116	1140	7.2	73	199.1	131
4/24	3	658	13	3	1	l	10	2	1124	1144	3.2	74	199.1	151.3
4/24	3	346	14	3	1	l	20	2	1131	1152	4.8	73.3	199.8	136.8
4/24	3	788	15	3	1	m	20	2	1141	1201	6.3	75	199.9	135.3
4/24	3	739	16	3	1	h	30	2	1150	1208	5	73	199.6	128
4/24	3	450	17	3	1	r	10	2	1156	1216	4.2	74.6	199	143.5
4/24	3	160	18	3	1	b	30	2	1200	1224	4.7	73.2	199	1120
4/28	1	058	1	3	5	h	20	1	902	927	6.6	73.2	196.7	135.1
4/28	1	051	2	3	5	c	10	1	904	936	6.7	75	197.2	129.5
4/28	1	480	3	3	5	l	10	1	905	938	5.5	74.1	197	140.4
4/28	1	623	4	3	5	l	20	1	928	952	9.5	74	197.9	133.5
4/28	1	374	5	3	5	m	10	1	931	958	10.1	73.8	197.9	146
4/28	1	382	6	3	5	b	30	1	939	1005	10.2	74	196.9	113
4/28	2	090	7	3	5	c	20	1	957	1016	9.3	73.8	198.5	138.2
4/28	2	752	8	3	5	r	20	1	957	1030	7	73	196.8	124.3
4/28	2	386	9	3	5	b	20	1	1000	1032	8.9	74	197.5	129.9
4/28	2	378	10	3	5	m	30	1	1006	139	11	73.2	197.4	115.2
4/28	2	304	11	3	5	m	20	1	1018	1044	9.4	73	198.6	136.5
4/28	2	903	12	3	5	b	10	1	1032	1058	11	74.5	198.3	145.4
4/28	3	464	13	3	5	h	10	1	1037	1102	8.2	74.7	198.3	158.9
4/28	3	201	14	3	5	r	30	1	1039	1104	7.1	73.6	196.8	117.7
4/28	3	532	15	3	5	r	10	1	1047	1111	9.4	73	196.9	145.3
4/28	3	665	16	3	5	l	30	1	1100	1127	8	73.7	197.9	117.9

4/28	3	473	17	3	5	c	30	1	1103	1131	10.2	73	197.4	114.9
4/28	3	161	18	3	5	h	30	1	1105	1136	9.1	74.5	197.9	120.2
4/28	1	058	1	3	5	h	20	2	902	928	5.5	73.8	196.8	132.8
4/28	1	051	2	3	5	c	10	2	904	937	7.4	73.2	197.9	131.2
4/28	1	480	3	3	5	l	10	2	905	938	5.1	73	197.3	136.8
4/28	1	623	4	3	5	l	20	2	928	954	7.6	73.3	197.9	134.2
4/28	1	374	5	3	5	m	10	2	931	958	9	74	198.5	145.7
4/28	1	382	6	3	5	b	30	2	939	1005	9.8	73.6	197.8	114.2
4/28	2	090	7	3	5	c	20	2	957		8.1	73	198.1	142.3
4/28	2	752	8	3	5	r	20	2	957	1030	7.2	73	198	123.5
4/28	2	386	9	3	5	b	20	2	1000	1032	9.2	73.6	198.3	125.1
4/28	2	378	10	3	5	m	30	2	1006	1038	8	73	197.6	116.6
4/28	2	304	11	3	5	m	20	2	1018	1045	8.9	74.2	198.2	128.7
4/28	2	903	12	3	5	b	10	2	1032	1058	11.8	73.1	201.4	147.7
4/28	3	464	13	3	5	h	10	2	1037	1102	7.6	73.3	196.3	150.4
4/28	3	201	14	3	5	r	30	2	1039	1105	7.6	74	196.6	113.7
4/28	3	532	15	3	5	r	10	2	1047	1111	7.2	73.7	197.6	146.1
4/28	3	665	16	3	5	l	30	2	1100	1129	7.8	73	197	116.1
4/28	3	473	17	3	5	c	30	2	1103	1130	9.6	73.2	196.2	114.7
4/28	3	161	18	3	5	h	30	2	1105	1136	9.5	73.8	197.7	118.7

SENSORY

Date	Session	S3D	Order	Rep	Day	Trt	Fat	Panel	CkBeef	CkFat	Serum	Grainy	Musty	Brown	Sorg
4/10	1	056	1	1	1	L	20	Inglis	5	4	2	0	1	0	0
4/10	1	77	2	1	1	B	10	Inglis	5	4	2	0	2	0	0
4/10	1	257	3	1	1	R	30	Inglis	5	4	2	0	0	0	0
4/10	1	140	4	1	1	C	10	Inglis	5	4	2	0	2	0	0
4/10	1	262	5	1	1	R	10	Inglis	5	4	2	0	2	0	0
4/10	1	393	6	1	1	H	30	Inglis	5	4	2	0	1	0	0
4/10	2	578	7	1	1	R	20	Inglis	5	4	2	0	0	0	0
4/10	2	568	8	1	1	L	30	Inglis	5	4	2	0	0	0	0
4/10	2	273	9	1	1	H	10	Inglis	5	4	2	0	2	2	0
4/10	2	766	10	1	1	B	30	Inglis	5	4	2	0	2	2	0
4/10	2	996	11	1	1	H	20	Inglis	5	4	2	0	2	2	0
4/10	2	749	12	1	1	C	30	Inglis	5	4	2	0	0	0	0
4/10	3	799	13	1	1	M	20	Inglis	5	4	2	0	0	0	0
4/10	3	071	14	1	1	M	30	Inglis	5	4	2	0	1	0	2
4/10	3	914	15	1	1	B	20	Inglis	5	4	2	0	2	0	0
4/10	3	813	16	1	1	C	20	Inglis	5	4	2	0	0	2	0
4/10	3	312	17	1	1	M	10	Inglis	5	4	2	0	0	2	1
4/10	3	517	18	1	1	L	10	Inglis	5	4	2	0	1	2	0
4/10	1	056	1	1	1	L	20	Gray	4	2	3	1	2	2	0
4/10	1	77	2	1	1	B	10	Gray	5	3	3	2	3	2	0
4/10	1	257	3	1	1	R	30	Gray	5	3	3	1	3	2	0
4/10	1	140	4	1	1	C	10	Gray	6	3	2	1	3	2	0
4/10	1	262	5	1	1	R	10	Gray	4	2	2	2	4	2	0
4/10	1	393	6	1	1	H	30	Gray	4	4	2	1	2	2	0
4/10	2	578	7	1	1	R	20	Gray	4	3	2	2	2	1	0
4/10	2	568	8	1	1	L	30	Gray	4	4	3	2	3	2	0
4/10	2	273	9	1	1	H	10	Gray	3	4	3	2	4	2	0
4/10	2	766	10	1	1	B	30	Gray	3	3	3	1	2	2	0
4/10	2	996	11	1	1	H	20	Gray	3	3	2	1	3	2	0
4/10	2	749	12	1	1	C	30	Gray	3	5	2	1	3	0	0
4/10	3	799	13	1	1	M	20	Gray	6	4	2	1	3	2	0
4/10	3	071	14	1	1	M	30	Gray	6	3	2	1	2	3	0
4/10	3	914	15	1	1	B	20	Gray	7	3	1	1	1	3	0
4/10	3	813	16	1	1	C	20	Gray	4	2	2	1	2	3	0
4/10	3	312	17	1	1	M	10	Gray	3	4	2	1	4	3	0
4/10	3	517	18	1	1	L	10	Gray	4	4	2	1	4	3	0
4/10	1	056	1	1	1	L	20	Mason	6	3	2	0	0	0	0
4/10	1	77	2	1	1	B	10	Mason	6	3	3	0	0	0	0

4/10	1	257	3	1	1	R	30	Mason	6	4	2	2	0	1	0
4/10	1	140	4	1	1	C	10	Mason	6	2	2	2	1	2	0
4/10	1	262	5	1	1	R	10	Mason	5	3	2	1	1	0	0
4/10	1	393	6	1	1	H	30	Mason	6	4	3	0	1	1	0
4/10	2	578	7	1	1	R	20	Mason	5	3	2	1	1	0	0
4/10	2	568	8	1	1	L	30	Mason	6	4	2	1	0	0	0
4/10	2	273	9	1	1	H	10	Mason	3	3	2	3	2	0	3
4/10	2	766	10	1	1	B	30	Mason	5	4	2	1	0	1	0
4/10	2	996	11	1	1	H	20	Mason	3	3	1	2	2	0	3
4/10	2	749	12	1	1	C	30	Mason	6	4	3	2	1	1	0
4/10	3	799	13	1	1	M	20	Mason	5	3	1	2	1	0	2
4/10	3	071	14	1	1	M	30	Mason	6	3	2	2	0	2	1
4/10	3	914	15	1	1	B	20	Mason	6	3	2	2	0	2	0
4/10	3	813	16	1	1	C	20	Mason	4	3	0	3	2	0	3
4/10	3	312	17	1	1	M	10	Mason	3	3	1	3	2	0	3
4/10	3	517	18	1	1	L	10	Mason	4	3	2	3	2	0	0
4/10	1	056	1	1	1	L	20	Capps	5	2	2	0	1	1	0
4/10	1	77	2	1	1	B	10	Capps	5	3	3	0	0	0	0
4/10	1	257	3	1	1	R	30	Capps	4	3	2	0	2	0	0
4/10	1	140	4	1	1	C	10	Capps	5	2	2	0	2	2	0
4/10	1	262	5	1	1	R	10	Capps	4	3	2	2	0	0	0
4/10	1	393	6	1	1	H	30	Capps	5	3	2	0	0	0	0
4/10	2	578	7	1	1	R	20	Capps	4	3	2	0	0	0	0
4/10	2	568	8	1	1	L	30	Capps	5	2	2	2	2	0	0
4/10	2	273	9	1	1	H	10	Capps	4	2	2	3	2	2	0
4/10	2	766	10	1	1	B	30	Capps	5	3	2	0	2	2	0
4/10	2	996	11	1	1	H	20	Capps	4	2	2	3	2	2	0
4/10	2	749	12	1	1	C	30	Capps	4	3	3	0	2	0	0
4/10	3	799	13	1	1	M	20	Capps	5	3	2	2	2	1	0
4/10	3	071	14	1	1	M	30	Capps	5	3	2	0	2	2	0
4/10	3	914	15	1	1	B	20	Capps	5	3	1	0	2	2	0
4/10	3	813	16	1	1	C	20	Capps	5	2	2	2	0	3	0
4/10	3	312	17	1	1	M	10	Capps	4	3	2	3	2	2	0
4/10	3	517	18	1	1	L	10	Capps	5	3	3	0	2	0	0
4/10	1	056	1	1	1	L	20	Higgins	6	3	2	0	0	0	0
4/10	1	77	2	1	1	B	10	Higgins	7	4	1	0	1	0	0
4/10	1	257	3	1	1	R	30	Higgins	6	4	1	1	0	1	0
4/10	1	140	4	1	1	C	10	Higgins	6	3	0	1	1	0	0
4/10	1	262	5	1	1	R	10	Higgins	7	3	0	1	0	0	0
4/10	1	393	6	1	1	H	30	Higgins	7	4	1	0	0	0	0
4/10	2	578	7	1	1	R	20	Higgins	6	4	1	0	0	0	0

4/10	2	568	8	1	1	L	30	Higgins	7	4	1	0	0	1	0
4/10	2	273	9	1	1	H	10	Higgins	7	3	1	1	0	1	0
4/10	2	766	10	1	1	B	30	Higgins	6	3	1	1	1	1	0
4/10	2	996	11	1	1	H	20	Higgins	6	3	1	1	1	1	0
4/10	2	749	12	1	1	C	30	Higgins	7	4	1	1	1	1	0
4/10	3	799	13	1	1	M	20	Higgins	5	3	0	1	1	1	0
4/10	3	071	14	1	1	M	30	Higgins	5	4	0	1	0	1	0
4/10	3	914	15	1	1	B	20	Higgins	5	3	0	1	1	1	0
4/10	3	813	16	1	1	C	20	Higgins	5	3	0	1	2	1	0
4/10	3	312	17	1	1	M	10	Higgins	6	4	0	1	1	1	0
4/10	3	517	18	1	1	L	10	Higgins	6	4	0	1	1	1	0
4/10	1	056	1	1	1	L	20	Runyon	5	3	2	0	0	0	0
4/10	1	77	2	1	1	B	10	Runyon	4	2	3	0	1	0	0
4/10	1	257	3	1	1	R	30	Runyon	4	2	3	0	2	0	0
4/10	1	140	4	1	1	C	10	Runyon	5	2	1	0	0	0	0
4/10	1	262	5	1	1	R	10	Runyon	4	2	1	0	2	0	0
4/10	1	393	6	1	1	H	30	Runyon	4	3	2	0	0	0	0
4/10	2	578	7	1	1	R	20	Runyon	5	3	3	0	1	0	0
4/10	2	568	8	1	1	L	30	Runyon	5	3	3	0	0	0	0
4/10	2	273	9	1	1	H	10	Runyon	5	3	0	2	3	0	0
4/10	2	766	10	1	1	B	30	Runyon	5	3	3	0	0	2	0
4/10	2	996	11	1	1	H	20	Runyon	4	2	0	2	2	0	0
4/10	2	749	12	1	1	C	30	Runyon	4	3	3	0	0	0	0
4/10	3	799	13	1	1	M	20	Runyon	5	3	2	1	1	1	0
4/10	3	071	14	1	1	M	30	Runyon	6	3	1	1	1	2	0
4/10	3	914	15	1	1	B	20	Runyon	5	3	1	0	0	0	0
4/10	3	813	16	1	1	C	20	Runyon	4	1	0	0	3	0	0
4/10	3	312	17	1	1	M	10	Runyon	4	1	0	2	3	0	0
4/10	3	517	18	1	1	L	10	Runyon	5	3	1	0	0	0	0
4/14	1	741	1	1	5	H	20	Inglis	5	4	2	0	1	2	2
4/14	1	866	2	1	5	C	10	Inglis	5	4	2	0	0	2	0
4/14	1	301	3	1	5	L	10	Inglis	5	4	2	0	0	2	0
4/14	1	242	4	1	5	L	20	Inglis	5	4	2	0	0	2	2
4/14	1	338	5	1	5	B	30	Inglis	5	4	2	0	0	2	3
4/14	1	292	6	1	5	M	10	Inglis	5	3	2	0	0	1	2
4/14	2	855	7	1	5	C	20	Inglis	4	4	3	0	0	0	2
4/14	2	139	8	1	5	B	20	Inglis	4	3	3	0	0	2	0
4/14	2	747	9	1	5	R	20	Inglis	4	3	3	0	0	2	0
4/14	2	620	10	1	5	M	30	Inglis	4	3	1	0	0	2	0
4/14	2	697	11	1	5	M	20	Inglis	4	3	1	0	0	2	0
4/14	2	093	12	1	5	B	10	Inglis	4	3	1	0	0	2	0

4/14	3	743	13	1	5	H	10	Inglis	4	3	0	0	0	2	4
4/14	3	445	14	1	5	R	30	Inglis	4	3	0	0	0	2	0
4/14	3	095	15	1	5	R	10	Inglis	4	3	0	0	0	2	0
4/14	3	198	16	1	5	L	30	Inglis	4	3	0	0	0	2	0
4/14	3	987	17	1	5	C	30	Inglis	4	3	0	0	0	2	0
4/14	3	227	18	1	5	H	30	Inglis	4	3	0	0	1	2	0
4/14	1	741	1	1	5	H	20	Gray	4	3	0	0	1	2	0
4/14	1	866	2	1	5	C	10	Gray	4	4	0	0	2	2	0
4/14	1	301	3	1	5	L	10	Gray	3	4	0	0	3	2	3
4/14	1	242	4	1	5	L	20	Gray	4	4	0	0	2	3	3
4/14	1	338	5	1	5	B	30	Gray	4	3	0	0	2	3	3
4/14	1	292	6	1	5	M	10	Gray	4	4	0	0	3	3	3
4/14	2	855	7	1	5	C	20	Gray	3	5	0	0	2	1	0
4/14	2	139	8	1	5	B	20	Gray	4	4	0	0	2	2	0
4/14	2	747	9	1	5	R	20	Gray	4	4	0	0	2	2	0
4/14	2	620	10	1	5	M	30	Gray	4	5	0	0	2	3	3
4/14	2	697	11	1	5	M	20	Gray	3	5	0	0	3	3	3
4/14	2	093	12	1	5	B	10	Gray	4	3	0	0	3	2	0
4/14	3	743	13	1	5	H	10	Gray	3	4	2	0	3	3	3
4/14	3	445	14	1	5	R	30	Gray	3	3	2	0	2	2	0
4/14	3	095	15	1	5	R	10	Gray	3	3	2	0	2	2	3
4/14	3	198	16	1	5	L	30	Gray	3	3	2	0	2	2	0
4/14	3	987	17	1	5	C	30	Gray	5	4	2	0	2	3	0
4/14	3	227	18	1	5	H	30	Gray	5	4	1	0	2	3	0
4/14	1	741	1	1	5	H	20	Mason	3	4	0	2	0	0	2
4/14	1	866	2	1	5	C	10	Mason	5	3	2	0	0	2	0
4/14	1	301	3	1	5	L	10	Mason	3	3	2	2	0	1	0
4/14	1	242	4	1	5	L	20	Mason	3	4	2	2	0	1	2
4/14	1	338	5	1	5	B	30	Mason	4	4	2	2	0	2	1
4/14	1	292	6	1	5	M	10	Mason	5	3	1	1	0	3	0
4/14	2	855	7	1	5	C	20	Mason	5	3	3	0	0	1	0
4/14	2	139	8	1	5	B	20	Mason	5	4	2	1	0	1	0
4/14	2	747	9	1	5	R	20	Mason	6	4	2	0	0	2	0
4/14	2	620	10	1	5	M	30	Mason	3	4	0	2	0	2	3
4/14	2	697	11	1	5	M	20	Mason	3	4	1	2	0	1	3
4/14	2	093	12	1	5	B	10	Mason	4	3	1	2	0	0	2
4/14	3	743	13	1	5	H	10	Mason	3	2	0	3	0	2	4
4/14	3	445	14	1	5	R	30	Mason	4	4	2	2	0	0	0
4/14	3	095	15	1	5	R	10	Mason	4	4	2	2	0	0	1
4/14	3	198	16	1	5	L	30	Mason	3	4	0	2	0	1	2
4/14	3	987	17	1	5	C	30	Mason	3	4	1	2	0	0	2

4/14	3	227	18	1	5	H	30	Mason	4	4	2	2	0	3	0
4/14	1	741	1	1	5	H	20	Capps	6	3	2	0	0	2	0
4/14	1	866	2	1	5	C	10	Capps	5	3	1	0	2	3	0
4/14	1	301	3	1	5	L	10	Capps	5	2	2	1	1	3	0
4/14	1	242	4	1	5	L	20	Capps	4	2	2	2	2	2	0
4/14	1	338	5	1	5	B	30	Capps	5	3	2	0	0	0	0
4/14	1	292	6	1	5	M	10	Capps	5	2	0	2	2	3	0
4/14	2	855	7	1	5	C	20	Capps	5	4	2	2	2	0	0
4/14	2	139	8	1	5	B	20	Capps	4	3	2	2	2	0	0
4/14	2	747	9	1	5	R	20	Capps	4	3	2	0	2	2	0
4/14	2	620	10	1	5	M	30	Capps	4	3	0	3	2	2	0
4/14	2	697	11	1	5	M	20	Capps	5	3	0	3	2	2	0
4/14	2	093	12	1	5	B	10	Capps	5	3	0	2	2	3	0
4/14	3	743	13	1	5	H	10	Capps	4	2	1	3	2	1	0
4/14	3	445	14	1	5	R	30	Capps	4	2	0	3	2	2	0
4/14	3	095	15	1	5	R	10	Capps	4	3	2	2	1	2	0
4/14	3	198	16	1	5	L	30	Capps	4	3	2	1	1	1	0
4/14	3	987	17	1	5	C	30	Capps	5	3	0	2	2	3	0
4/14	3	227	18	1	5	H	30	Capps	5	3	2	2	2	2	0
4/14	1	741	1	1	5	H	20	Higgins	6	3	1	0	0	1	0
4/14	1	866	2	1	5	C	10	Higgins	5	3	0	1	1	1	0
4/14	1	301	3	1	5	L	10	Higgins	6	4	1	0	0	1	0
4/14	1	242	4	1	5	L	20	Higgins	7	4	1	1	0	0	0
4/14	1	338	5	1	5	B	30	Higgins	7	4	1	1	0	0	0
4/14	1	292	6	1	5	M	10	Higgins	7	4	1	1	0	1	0
4/14	2	855	7	1	5	C	20	Higgins	7	4	1	1	0	1	0
4/14	2	139	8	1	5	B	20	Higgins	6	3	1	1	0	1	0
4/14	2	747	9	1	5	R	20	Higgins	7	4	1	1	0	1	0
4/14	2	620	10	1	5	M	30	Higgins	6	3	1	0	0	1	0
4/14	2	697	11	1	5	M	20	Higgins	6	3	1	0	0	2	0
4/14	2	093	12	1	5	B	10	Higgins	7	4	1	0	0	2	0
4/14	3	743	13	1	5	H	10	Higgins	6	3	2	0	0	1	0
4/14	3	445	14	1	5	R	30	Higgins	6	4	2	1	0	1	0
4/14	3	095	15	1	5	R	10	Higgins	6	4	1	0	0	1	0
4/14	3	198	16	1	5	L	30	Higgins	6	4	2	0	0	2	0
4/14	3	987	17	1	5	C	30	Higgins	6	4	2	1	0	2	0
4/14	3	227	18	1	5	H	30	Higgins	6	4	2	1	0	2	0
4/14	1	741	1	1	5	H	20	Runyon	4	3	2	0	2	0	0
4/14	1	866	2	1	5	C	10	Runyon	5	3	1	0	0	1	0
4/14	1	301	3	1	5	L	10	Runyon	4	3	1	0	2	0	0
4/14	1	242	4	1	5	L	20	Runyon	5	3	2	0	1	0	0

4/14	1	338	5	1	5	B	30	Runyon	5	3	2	0	0	0	0
4/14	1	292	6	1	5	M	10	Runyon	4	3	0	2	3	1	0
4/14	2	855	7	1	5	C	20	Runyon	4	4	2	0	0	0	0
4/14	2	139	8	1	5	B	20	Runyon	4	3	1	0	2	0	0
4/14	2	747	9	1	5	R	20	Runyon	5	2	2	0	0	1	0
4/14	2	620	10	1	5	M	30	Runyon	5	4	0	2	3	2	0
4/14	2	697	11	1	5	M	20	Runyon	5	3	1	0	2	0	0
4/14	2	093	12	1	5	B	10	Runyon	5	2	1	0	3	0	0
4/14	3	743	13	1	5	H	10	Runyon	4	2	0	2	3	0	0
4/14	3	445	14	1	5	R	30	Runyon	4	2	0	2	0	0	0
4/14	3	095	15	1	5	R	10	Runyon	4	3	0	0	2	0	0
4/14	3	198	16	1	5	L	30	Runyon	4	2	2	2	3	0	0
4/14	3	987	17	1	5	C	30	Runyon	5	3	0	0	0	2	0
4/14	3	227	18	1	5	H	30	Runyon	5	3	0	0	2	0	0
4/17	1	407	1	2	1	C	10	Inglis	5	3	2	0	0	2	2
4/17	1	484	2	2	1	B	30	Inglis	5	3	2	0	0	2	0
4/17	1	357	3	2	1	H	10	Inglis	5	4	2	0	0	0	2
4/17	1	929	4	2	1	M	30	Inglis	4	3	2	0	0	0	0
4/17	1	475	5	2	1	M	20	Inglis	5	3	0	0	0	2	0
4/17	1	176	6	2	1	R	30	Inglis	5	3	2	0	0	2	0
4/17	2	802	7	2	1	M	30	Inglis	5	4	2	0	0	1	1
4/17	2	823	8	2	1	L	30	Inglis	5	4	2	0	1	1	2
4/17	2	222	9	2	1	H	20	Inglis	5	4	2	0	1	2	0
4/17	2	174	10	2	1	C	20	Inglis	5	4	2	0	1	0	2
4/17	2	908	11	2	1	M	10	Inglis	5	4	2	0	1	1	2
4/17	2	288	12	2	1	L	20	Inglis	5	5	2	0	1	0	0
4/17	3	530	13	2	1	B	20	Inglis	5	3	3	0	0	0	0
4/17	3	272	14	2	1	R	10	Inglis	4	3	3	0	0	0	0
4/17	3	469	15	2	1	C	30	Inglis	5	3	2	0	0	1	2
4/17	3	358	16	2	1	L	10	Inglis	5	4	2	0	1	2	0
4/17	3	714	17	2	1	R	20	Inglis	5	5	3	0	0	0	0
4/17	3	237	18	2	1	B	10	Inglis	5	3	3	0	0	0	0
4/17	1	407	1	2	1	C	10	Gray	5	4	2	0	1	2	0
4/17	1	484	2	2	1	B	30	Gray	4	5	2	0	1	2	0
4/17	1	357	3	2	1	H	10	Gray	3	4	2	0	2	3	2
4/17	1	929	4	2	1	M	30	Gray	4	4	1	0	2	2	2
4/17	1	475	5	2	1	M	20	Gray	5	5	2	0	2	2	1
4/17	1	176	6	2	1	R	30	Gray	3	5	2	0	2	1	2
4/17	2	802	7	2	1	M	30	Gray	3	4	2	0	2	2	0
4/17	2	823	8	2	1	L	30	Gray	4	4	2	0	2	2	2
4/17	2	222	9	2	1	H	20	Gray	3	4	2	0	3	2	3

4/17	2	174	10	2	1	C	20	Gray	5	3	2	0	0	2	0
4/17	2	908	11	2	1	M	10	Gray	4	3	2	0	3	2	2
4/17	2	288	12	2	1	L	20	Gray	5	5	2	0	0	2	0
4/17	3	530	13	2	1	B	20	Gray	5	3	2	0	0	1	0
4/17	3	272	14	2	1	R	10	Gray	4	3	2	0	2	2	3
4/17	3	469	15	2	1	C	30	Gray	3	5	2	0	2	2	2
4/17	3	358	16	2	1	L	10	Gray	3	4	2	0	3	2	2
4/17	3	714	17	2	1	R	20	Gray	3	4	2	0	3	2	2
4/17	3	237	18	2	1	B	10	Gray	4	3	2	0	2	2	1
4/17	1	407	1	2	1	C	10	Mason	5	3	2	0	0	0	0
4/17	1	484	2	2	1	B	30	Mason	5	4	2	0	0	2	0
4/17	1	357	3	2	1	H	10	Mason	3	4	0	3	0	2	3
4/17	1	929	4	2	1	M	30	Mason	4	4	1	1	0	2	0
4/17	1	475	5	2	1	M	20	Mason	5	4	2	0	0	2	0
4/17	1	176	6	2	1	R	30	Mason	5	4	2	0	0	2	3
4/17	2	802	7	2	1	M	30	Mason	3	4	0	3	0	0	0
4/17	2	823	8	2	1	L	30	Mason	4	4	2	1	0	0	4
4/17	2	222	9	2	1	H	20	Mason	3	4	0	3	0	2	0
4/17	2	174	10	2	1	C	20	Mason	5	3	2	0	0	1	3
4/17	2	908	11	2	1	M	10	Mason	4	4	0	2	0	0	0
4/17	2	288	12	2	1	L	20	Mason	5	4	2	0	0	1	0
4/17	3	530	13	2	1	B	20	Mason	6	3	2	0	0	2	2
4/17	3	272	14	2	1	R	10	Mason	5	3	2	2	0	1	0
4/17	3	469	15	2	1	C	30	Mason	6	5	2	0	0	2	0
4/17	3	358	16	2	1	L	10	Mason	4	4	1	2	0	0	0
4/17	3	714	17	2	1	R	20	Mason	6	4	2	0	0	2	0
4/17	3	237	18	2	1	B	10	Mason	4	4	2	0	0	2	0
4/17	1	407	1	2	1	C	10	Capps	5	3	2	0	0	2	0
4/17	1	484	2	2	1	B	30	Capps	5	4	2	0	0	0	0
4/17	1	357	3	2	1	H	10	Capps	4	2	0	3	2	2	0
4/17	1	929	4	2	1	M	30	Capps	5	3	2	2	2	2	0
4/17	1	475	5	2	1	M	20	Capps	5	4	2	3	2	2	0
4/17	1	176	6	2	1	R	30	Capps	4	4	2	0	0	0	0
4/17	2	802	7	2	1	M	30	Capps	5	3	2	3	2	2	0
4/17	2	823	8	2	1	L	30	Capps	4	3	2	2	1	0	0
4/17	2	222	9	2	1	H	20	Capps	4	3	0	4	2	2	0
4/17	2	174	10	2	1	C	20	Capps	5	3	2	2	2	2	0
4/17	2	908	11	2	1	M	10	Capps	5	3	2	2	2	2	0
4/17	2	288	12	2	1	L	20	Capps	4	4	2	0	0	2	0
4/17	3	530	13	2	1	B	20	Capps	4	3	2	2	2	3	0
4/17	3	272	14	2	1	R	10	Capps	4	2	0	1	1	2	0

4/17	3	469	15	2	1	C	30	Capps	4	4	2	1	1	0	0
4/17	3	358	16	2	1	L	10	Capps	5	4	2	2	2	3	0
4/17	3	714	17	2	1	R	20	Capps	4	3	3	0	0	2	0
4/17	3	237	18	2	1	B	10	Capps	5	2	2	0	0	2	0
4/17	1	407	1	2	1	C	10	Higgins	6	3	2	1	0	1	0
4/17	1	484	2	2	1	B	30	Higgins	6	3	2	0	0	1	0
4/17	1	357	3	2	1	H	10	Higgins	7	4	2	1	1	2	0
4/17	1	929	4	2	1	M	30	Higgins	6	3	1	1	0	1	0
4/17	1	475	5	2	1	M	20	Higgins	6	3	2	1	1	1	0
4/17	1	176	6	2	1	R	30	Higgins	7	4	2	1	1	1	0
4/17	2	802	7	2	1	M	30	Higgins	6	3	1	1	0	1	0
4/17	2	823	8	2	1	L	30	Higgins	7	4	2	1	0	1	0
4/17	2	222	9	2	1	H	20	Higgins	7	4	1	1	1	2	0
4/17	2	174	10	2	1	C	20	Higgins	7	4	1	1	1	2	0
4/17	2	908	11	2	1	M	10	Higgins	6	3	1	1	1	2	0
4/17	2	288	12	2	1	L	20	Higgins	7	4	1	1	0	1	0
4/17	3	530	13	2	1	B	20	Higgins	6	4	1	1	1	2	0
4/17	3	272	14	2	1	R	10	Higgins	7	4	1	1	0	1	0
4/17	3	469	15	2	1	C	30	Higgins	7	4	2	1	0	2	0
4/17	3	358	16	2	1	L	10	Higgins	6	3	2	1	1	3	0
4/17	3	714	17	2	1	R	20	Higgins	7	4	2	1	0	2	0
4/17	3	237	18	2	1	B	10	Higgins	7	4	2	1	1	2	0
4/21	1	851	1	2	5	C	30	Inglis	5	4	2	0	0	0	2
4/21	1	594	2	2	5	M	30	Inglis	5	4	2	0	0	2	3
4/21	1	522	3	2	5	C	10	Inglis	5	4	2	0	0	0	0
4/21	1	567	4	2	5	H	20	Inglis	5	4	2	0	0	2	2
4/21	1	801	5	2	5	H	10	Inglis	5	4	2	0	0	2	2
4/21	1	836	6	2	5	R	30	Inglis	4	4	3	0	0	0	2
4/21	2	807	7	2	5	C	20	Inglis	5	4	3	0	0	1	0
4/21	2	976	8	2	5	R	10	Inglis	5	3	2	0	0	2	0
4/21	2	137	9	2	5	H	30	Inglis	4	4	0	0	0	0	2
4/21	2	904	10	2	5	R	20	Inglis	4	4	3	0	0	2	2
4/21	2	146	11	2	5	M	20	Inglis	5	4	2	0	0	2	2
4/21	2	774	12	2	5	B	20	Inglis	5	4	2	0	0	0	0
4/21	3	512	13	2	5	B	10	Inglis	4	3	3	0	0	2	0
4/21	3	906	14	2	5	M	10	Inglis	5	4	2	0	0	2	2
4/21	3	289	15	2	5	L	10	Inglis	4	3	2	0	0	0	0
4/21	3	436	16	2	5	L	30	Inglis	4	4	2	0	0	2	0
4/21	3	226	17	2	5	L	20	Inglis	5	4	2	0	0	2	2
4/21	3	859	18	2	5	B	30	Inglis	5	4	0	0	0	0	0
4/21	1	851	1	2	5	C	30	Gray	5	4	2	0	0	1	0

4/21	1	594	2	2	5	M	30	Gray	6	4	1	0	0	2	0
4/21	1	522	3	2	5	C	10	Gray	5	3	2	0	0	2	0
4/21	1	567	4	2	5	H	20	Gray	4	5	2	0	0	2	0
4/21	1	801	5	2	5	H	10	Gray	3	3	2	0	0	2	0
4/21	1	836	6	2	5	R	30	Gray	3	4	2	0	0	1	0
4/21	2	807	7	2	5	C	20	Gray	5	4	2	0	0	2	0
4/21	2	976	8	2	5	R	10	Gray	4	4	2	0	1	3	0
4/21	2	137	9	2	5	H	30	Gray	3	4	1	0	3	2	0
4/21	2	904	10	2	5	R	20	Gray	4	4	2	0	3	2	0
4/21	2	146	11	2	5	M	20	Gray	4	4	2	0	2	2	0
4/21	2	774	12	2	5	B	20	Gray	4	4	2	0	2	2	0
4/21	3	512	13	2	5	B	10	Gray	4	4	2	0	2	1	0
4/21	3	906	14	2	5	M	10	Gray	3	4	2	0	3	2	0
4/21	3	289	15	2	5	L	10	Gray	3	4	2	0	3	2	0
4/21	3	436	16	2	5	L	30	Gray	3	4	2	0	3	3	0
4/21	3	226	17	2	5	L	20	Gray	5	4	2	0	2	2	0
4/21	3	859	18	2	5	B	30	Gray	5	4	2	0	3	2	0
4/21	1	851	1	2	5	C	30	Mason	4	4	2	0	0	0	0
4/21	1	594	2	2	5	M	30	Mason	3	4	0	2	0	2	2
4/21	1	522	3	2	5	C	10	Mason	5	2	2	0	0	1	0
4/21	1	567	4	2	5	H	20	Mason	3	3	0	2	0	0	3
4/21	1	801	5	2	5	H	10	Mason	3	3	1	2	0	1	3
4/21	1	836	6	2	5	R	30	Mason	5	5	3	0	0	0	0
4/21	2	807	7	2	5	C	20	Mason	6	3	2	0	0	2	0
4/21	2	976	8	2	5	R	10	Mason	5	3	2	0	0	2	0
4/21	2	137	9	2	5	H	30	Mason	3	4	0	2	0	1	3
4/21	2	904	10	2	5	R	20	Mason	4	4	1	1	0	0	1
4/21	2	146	11	2	5	M	20	Mason	3	4	0	2	0	2	3
4/21	2	774	12	2	5	B	20	Mason	5	4	2	0	0	1	0
4/21	3	512	13	2	5	B	10	Mason	4	3	0	2	0	1	1
4/21	3	906	14	2	5	M	10	Mason	3	3	0	2	0	0	3
4/21	3	289	15	2	5	L	10	Mason	4	4	1	1	0	0	1
4/21	3	436	16	2	5	L	30	Mason	3	5	0	2	0	2	3
4/21	3	226	17	2	5	L	20	Mason	3	4	0	2	0	0	3
4/21	3	859	18	2	5	B	30	Mason	4	5	1	2	0	0	2
4/21	1	851	1	2	5	C	30	Capps	5	3	2	1	0	0	0
4/21	1	594	2	2	5	M	30	Capps	5	3	1	2	2	2	0
4/21	1	522	3	2	5	C	10	Capps	4	3	1	2	2	0	0
4/21	1	567	4	2	5	H	20	Capps	4	3	1	3	2	2	0
4/21	1	801	5	2	5	H	10	Capps	4	2	2	4	3	2	0
4/21	1	836	6	2	5	R	30	Capps	4	4	2	3	2	2	0

4/21	2	807	7	2	5	C	20	Capps	4	3	2	3	3	2	0
4/21	2	976	8	2	5	R	10	Capps	5	3	2	2	2	3	0
4/21	2	137	9	2	5	H	30	Capps	4	4	2	4	3	2	0
4/21	2	904	10	2	5	R	20	Capps	4	4	2	3	2	2	0
4/21	2	146	11	2	5	M	20	Capps	4	4	2	3	3	2	0
4/21	2	774	12	2	5	B	20	Capps	5	3	3	2	2	2	0
4/21	3	512	13	2	5	B	10	Capps	4	2	1	2	1	3	0
4/21	3	906	14	2	5	M	10	Capps	4	3	2	4	2	3	0
4/21	3	289	15	2	5	L	10	Capps	4	3	1	3	2	0	0
4/21	3	436	16	2	5	L	30	Capps	3	3	2	4	3	0	0
4/21	3	226	17	2	5	L	20	Capps	3	3	3	4	3	0	0
4/21	3	859	18	2	5	B	30	Capps	4	3	2	2	1	1	0
4/21	1	851	1	2	5	C	30	Higgins	6	3	2	1	0	1	0
4/21	1	594	2	2	5	M	30	Higgins	6	4	2	0	0	1	0
4/21	1	522	3	2	5	C	10	Higgins	6	3	1	1	1	1	0
4/21	1	567	4	2	5	H	20	Higgins	7	4	1	1	0	2	0
4/21	1	801	5	2	5	H	10	Higgins	6	4	2	1	1	2	0
4/21	1	836	6	2	5	R	30	Higgins	7	4	2	1	0	1	0
4/21	2	807	7	2	5	C	20	Higgins	6	4	1	1	0	2	0
4/21	2	976	8	2	5	R	10	Higgins	6	4	1	1	0	1	0
4/21	2	137	9	2	5	H	30	Higgins	7	4	1	1	0	1	0
4/21	2	904	10	2	5	R	20	Higgins	6	4	2	1	1	1	0
4/21	2	146	11	2	5	M	20	Higgins	6	4	2	1	1	2	0
4/21	2	774	12	2	5	B	20	Higgins	7	4	2	1	1	2	0
4/21	3	512	13	2	5	B	10	Higgins	6	4	1	1	0	1	0
4/21	3	906	14	2	5	M	10	Higgins	6	3	1	1	0	1	0
4/21	3	289	15	2	5	L	10	Higgins	6	4	2	1	1	1	0
4/21	3	436	16	2	5	L	30	Higgins	6	4	1	1	0	1	0
4/21	3	226	17	2	5	L	20	Higgins	6	4	1	1	0	1	0
4/21	3	859	18	2	5	B	30	Higgins	6	3	1	1	1	2	0

Date	Session	S3D	Order	Rep	Day	Trt	Fat	Panel	Metallic	Astrin	Salt	Sour	Bitter	Sweet	Spring	Hard	Grit	Juice
4/10	1	056	1	1	1	L	20	Inglis	2	2	1	2	2	0	4	4	0	2
4/10	1	77	2	1	1	B	10	Inglis	2	2	1	2	2	0	4	4	0	2
4/10	1	257	3	1	1	R	30	Inglis	2	2	1	2	2	0	6	5	0	2
4/10	1	140	4	1	1	C	10	Inglis	3	3	1	2	3	0	6	5	0	2
4/10	1	262	5	1	1	R	10	Inglis	3	3	1	2	4	0	6	5	0	2
4/10	1	393	6	1	1	H	30	Inglis	2	2	1	2	2	0	6	5	0	2
4/10	2	578	7	1	1	R	20	Inglis	2	2	1	2	2	0	7	6	0	2
4/10	2	568	8	1	1	L	30	Inglis	2	2	1	2	2	0	7	6	0	2

4/10	2	273	9	1	1	H	10	Inglis	3	3	1	2	3	0	8	6	0	2
4/10	2	766	10	1	1	B	30	Inglis	2	2	1	2	3	0	8	6	0	2
4/10	2	996	11	1	1	H	20	Inglis	3	3	1	2	4	0	6	5	0	2
4/10	2	749	12	1	1	C	30	Inglis	2	2	1	2	2	0	5	4	0	2
4/10	3	799	13	1	1	M	20	Inglis	2	2	1	2	2	0	5	5	0	2
4/10	3	071	14	1	1	M	30	Inglis	2	3	1	2	3	0	6	5	0	2
4/10	3	914	15	1	1	B	20	Inglis	3	3	1	2	3	0	6	5	0	2
4/10	3	813	16	1	1	C	20	Inglis	2	2	1	2	3	0	8	6	0	2
4/10	3	312	17	1	1	M	10	Inglis	2	2	1	2	2	0	7	6	0	2
4/10	3	517	18	1	1	L	10	Inglis	2	2	1	2	3	0	7	6	0	2
4/10	1	056	1	1	1	L	20	Gray	3	3	2	3	3	0	8	4	0	3
4/10	1	77	2	1	1	B	10	Gray	2	3	2	2	3	0	8	5	0	3
4/10	1	257	3	1	1	R	30	Gray	3	3	2	2	3	0	7	5	0	3
4/10	1	140	4	1	1	C	10	Gray	2	2	2	3	3	0	6	5	0	2
4/10	1	262	5	1	1	R	10	Gray	3	3	2	3	4	0	6	4	0	3
4/10	1	393	6	1	1	H	30	Gray	2	3	2	3	3	0	6	4	0	4
4/10	2	578	7	1	1	R	20	Gray	2	2	2	2	3	0	7	4	0	3
4/10	2	568	8	1	1	L	30	Gray	3	3	2	3	3	0	8	5	0	3
4/10	2	273	9	1	1	H	10	Gray	3	3	2	3	5	0	6	6	0	4
4/10	2	766	10	1	1	B	30	Gray	2	2	2	3	3	0	5	4	0	4
4/10	2	996	11	1	1	H	20	Gray	3	3	2	3	4	0	6	4	0	3
4/10	2	749	12	1	1	C	30	Gray	3	3	2	3	4	0	2	2	0	4
4/10	3	799	13	1	1	M	20	Gray	2	3	2	3	3	0	6	4	0	3
4/10	3	071	14	1	1	M	30	Gray	2	3	2	3	3	0	6	4	0	4
4/10	3	914	15	1	1	B	20	Gray	3	3	2	3	3	0	5	4	0	4
4/10	3	813	16	1	1	C	20	Gray	3	3	2	3	3	0	7	5	0	3
4/10	3	312	17	1	1	M	10	Gray	3	3	2	3	4	0	8	5	0	3
4/10	3	517	18	1	1	L	10	Gray	3	3	2	3	4	0	7	5	0	4
4/10	1	056	1	1	1	L	20	Mason	3	2	2	2	2	2	5	6	0	3
4/10	1	77	2	1	1	B	10	Mason	3	2	2	2	2	2	4	6	0	3
4/10	1	257	3	1	1	R	30	Mason	3	3	2	2	3	2	6	6	0	3
4/10	1	140	4	1	1	C	10	Mason	2	2	2	2	3	1	7	6	2	2
4/10	1	262	5	1	1	R	10	Mason	3	3	2	3	3	2	4	6	2	2
4/10	1	393	6	1	1	H	30	Mason	3	3	2	3	3	2	5	5	0	3
4/10	2	578	7	1	1	R	20	Mason	2	3	2	2	2	2	6	6	0	2
4/10	2	568	8	1	1	L	30	Mason	2	3	2	3	3	2	6	6	0	3
4/10	2	273	9	1	1	H	10	Mason	2	3	2	3	3	2	6	6	2	3
4/10	2	766	10	1	1	B	30	Mason	3	3	2	2	2	2	6	5	0	3
4/10	2	996	11	1	1	H	20	Mason	2	3	2	3	3	2	6	6	2	2
4/10	2	749	12	1	1	C	30	Mason	3	3	2	3	3	2	4	6	0	3
4/10	3	799	13	1	1	M	20	Mason	2	2	2	3	3	1	7	5	2	3

4/10	3	071	14	1	1	M	30	Mason	2	2	2	2	2	2	7	7	1	3
4/10	3	914	15	1	1	B	20	Mason	2	2	2	2	2	2	8	6	1	3
4/10	3	813	16	1	1	C	20	Mason	2	3	2	3	3	0	8	6	4	2
4/10	3	312	17	1	1	M	10	Mason	2	3	2	2	2	2	8	6	4	2
4/10	3	517	18	1	1	L	10	Mason	2	3	2	2	2	2	8	5	3	2
4/10	1	056	1	1	1	L	20	Capps	2	2	2	2	2	1	8	6	0	2
4/10	1	77	2	1	1	B	10	Capps	2	1	2	2	3	0	7	6	6	3
4/10	1	257	3	1	1	R	30	Capps	2	2	2	2	2	2	8	6	0	3
4/10	1	140	4	1	1	C	10	Capps	2	2	2	2	2	1	7	6	2	2
4/10	1	262	5	1	1	R	10	Capps	2	1	2	3	3	0	8	6	0	3
4/10	1	393	6	1	1	H	30	Capps	2	1	2	2	2	1	7	6	0	4
4/10	2	578	7	1	1	R	20	Capps	2	1	2	2	2	1	7	6	0	3
4/10	2	568	8	1	1	L	30	Capps	2	2	2	2	2	0	8	7	0	3
4/10	2	273	9	1	1	H	10	Capps	2	2	2	2	3	1	7	6	0	4
4/10	2	766	10	1	1	B	30	Capps	2	2	2	3	3	2	8	6	0	4
4/10	2	996	11	1	1	H	20	Capps	2	1	2	2	3	0	8	6	0	4
4/10	2	749	12	1	1	C	30	Capps	2	2	2	2	2	1	2	3	0	3
4/10	3	799	13	1	1	M	20	Capps	2	1	2	2	2	0	5	6	0	3
4/10	3	071	14	1	1	M	30	Capps	2	1	2	2	2	0	8	6	0	4
4/10	3	914	15	1	1	B	20	Capps	2	2	2	2	2	2	8	6	0	4
4/10	3	813	16	1	1	C	20	Capps	2	2	2	2	2	1	9	7	0	2
4/10	3	312	17	1	1	M	10	Capps	2	2	2	2	2	0	8	7	0	3
4/10	3	517	18	1	1	L	10	Capps	2	2	2	2	2	0	8	6	0	4
4/10	1	056	1	1	1	L	20	Higgins	2	2	2	2	2	0	6	5	0	3
4/10	1	77	2	1	1	B	10	Higgins	3	3	2	2	2	0	6	5	1	4
4/10	1	257	3	1	1	R	30	Higgins	2	2	2	2	2	0	7	6	1	3
4/10	1	140	4	1	1	C	10	Higgins	2	2	2	2	2	0	7	7	1	3
4/10	1	262	5	1	1	R	10	Higgins	3	3	2	2	3	0	6	7	1	3
4/10	1	393	6	1	1	H	30	Higgins	2	2	2	2	2	0	6	6	1	4
4/10	2	578	7	1	1	R	20	Higgins	2	2	2	2	2	0	7	6	1	4
4/10	2	568	8	1	1	L	30	Higgins	2	2	2	2	2	0	7	6	1	3
4/10	2	273	9	1	1	H	10	Higgins	2	2	2	2	2	0	7	7	1	3
4/10	2	766	10	1	1	B	30	Higgins	2	2	2	2	2	0	7	6	1	3
4/10	2	996	11	1	1	H	20	Higgins	2	2	2	2	2	0	7	7	1	3
4/10	2	749	12	1	1	C	30	Higgins	2	2	2	2	2	0	7	6	1	4
4/10	3	799	13	1	1	M	20	Higgins	2	2	2	2	2	0	7	7	1	3
4/10	3	071	14	1	1	M	30	Higgins	2	2	2	2	2	0	8	7	1	2
4/10	3	914	15	1	1	B	20	Higgins	2	3	2	2	2	0	8	7	1	2
4/10	3	813	16	1	1	C	20	Higgins	2	3	2	2	3	0	8	7	1	2
4/10	3	312	17	1	1	M	10	Higgins	2	2	2	2	2	0	8	7	1	3
4/10	3	517	18	1	1	L	10	Higgins	2	2	2	2	2	0	8	7	1	2

4/10	1	056	1	1	1	L	20	Runyon	2	2	2	2	2	0	7	5	0	2
4/10	1	77	2	1	1	B	10	Runyon	2	2	2	2	2	0	4	6	0	3
4/10	1	257	3	1	1	R	30	Runyon	2	2	2	2	2	0	4	6	0	4
4/10	1	140	4	1	1	C	10	Runyon	2	3	2	2	2	0	5	6	0	3
4/10	1	262	5	1	1	R	10	Runyon	3	3	1	2	3	0	6	7	0	3
4/10	1	393	6	1	1	H	30	Runyon	2	2	2	2	2	0	4	6	0	3
4/10	2	578	7	1	1	R	20	Runyon	2	2	2	2	2	0	7	5	0	3
4/10	2	568	8	1	1	L	30	Runyon	2	2	2	2	2	1	5	5	0	4
4/10	2	273	9	1	1	H	10	Runyon	2	3	1	2	2	0	6	6	0	4
4/10	2	766	10	1	1	B	30	Runyon	2	2	2	2	2	0	5	5	0	3
4/10	2	996	11	1	1	H	20	Runyon	3	3	1	2	2	0	5	5	0	3
4/10	2	749	12	1	1	C	30	Runyon	3	3	1	2	2	0	5	5	0	3
4/10	3	799	13	1	1	M	20	Runyon	2	2	2	2	2	0	6	6	0	3
4/10	3	071	14	1	1	M	30	Runyon	2	2	2	2	2	0	5	5	0	4
4/10	3	914	15	1	1	B	20	Runyon	2	2	2	2	2	0	7	4	0	2
4/10	3	813	16	1	1	C	20	Runyon	3	3	1	2	3	0	6	6	0	2
4/10	3	312	17	1	1	M	10	Runyon	3	3	1	2	3	0	6	6	0	3
4/10	3	517	18	1	1	L	10	Runyon	2	2	1	2	2	0	7	5	0	3
4/14	1	741	1	1	5	H	20	Inglis	2	3	1	2	3	0	8	6	0	3
4/14	1	866	2	1	5	C	10	Inglis	2	2	1	2	2	0	8	6	0	3
4/14	1	301	3	1	5	L	10	Inglis	2	2	1	2	2	0	8	6	0	2
4/14	1	242	4	1	5	L	20	Inglis	2	3	1	2	3	0	8	6	0	3
4/14	1	338	5	1	5	B	30	Inglis	3	3	1	2	3	0	7	5	0	2
4/14	1	292	6	1	5	M	10	Inglis	2	2	1	2	3	0	8	6	0	2
4/14	2	855	7	1	5	C	20	Inglis	2	2	1	2	2	0	6	4	0	2
4/14	2	139	8	1	5	B	20	Inglis	2	3	1	2	3	0	7	6	0	2
4/14	2	747	9	1	5	R	20	Inglis	2	2	1	2	2	0	8	6	0	2
4/14	2	620	10	1	5	M	30	Inglis	2	2	1	2	2	0	8	6	0	2
4/14	2	697	11	1	5	M	20	Inglis	2	2	1	2	2	0	8	6	0	2
4/14	2	093	12	1	5	B	10	Inglis	2	3	1	2	4	0	8	6	0	2
4/14	3	743	13	1	5	H	10	Inglis	3	3	1	2	3	0	8	6	0	4
4/14	3	445	14	1	5	R	30	Inglis	2	2	1	2	2	0	8	6	0	3
4/14	3	095	15	1	5	R	10	Inglis	2	2	1	2	2	0	8	6	0	3
4/14	3	198	16	1	5	L	30	Inglis	2	2	1	2	3	0	8	6	0	3
4/14	3	987	17	1	5	C	30	Inglis	2	2	1	2	2	0	5	3	0	2
4/14	3	227	18	1	5	H	30	Inglis	2	2	1	2	3	0	8	6	0	2
4/14	1	741	1	1	5	H	20	Gray	3	3	2	3	4	0	8	6	0	3
4/14	1	866	2	1	5	C	10	Gray	3	3	2	3	3	0	7	4	0	3
4/14	1	301	3	1	5	L	10	Gray	3	3	2	3	3	0	8	7	0	3
4/14	1	242	4	1	5	L	20	Gray	3	3	2	3	3	0	7	5	0	4
4/14	1	338	5	1	5	B	30	Gray	3	3	2	3	3	0	8	5	0	3

4/14	1	292	6	1	5	M	10	Gray	3	3	2	3	4	0	8	6	0	3
4/14	2	855	7	1	5	C	20	Gray	3	3	2	3	3	0	5	4	0	4
4/14	2	139	8	1	5	B	20	Gray	3	3	2	3	3	0	8	6	0	3
4/14	2	747	9	1	5	R	20	Gray	3	3	2	3	3	0	7	6	0	3
4/14	2	620	10	1	5	M	30	Gray	3	3	2	2	3	0	7	6	0	3
4/14	2	697	11	1	5	M	20	Gray	3	3	2	3	4	0	8	6	0	3
4/14	2	093	12	1	5	B	10	Gray	3	3	2	3	4	0	7	6	0	3
4/14	3	743	13	1	5	H	10	Gray	3	3	2	3	3	0	8	6	0	3
4/14	3	445	14	1	5	R	30	Gray	3	3	2	3	3	0	7	5	0	3
4/14	3	095	15	1	5	R	10	Gray	3	3	2	3	3	0	8	6	0	3
4/14	3	198	16	1	5	L	30	Gray	3	3	2	3	3	0	8	5	0	4
4/14	3	987	17	1	5	C	30	Gray	3	3	2	3	3	0	8	6	0	3
4/14	3	227	18	1	5	H	30	Gray	3	3	2	3	3	0	8	6	0	3
4/14	1	741	1	1	5	H	20	Mason	2	3	2	3	3	0	7	6	0	3
4/14	1	866	2	1	5	C	10	Mason	2	2	2	3	2	0	7	5	0	3
4/14	1	301	3	1	5	L	10	Mason	2	3	2	3	2	0	8	6	0	3
4/14	1	242	4	1	5	L	20	Mason	2	3	2	2	3	0	7	6	0	2
4/14	1	338	5	1	5	B	30	Mason	2	2	2	2	3	0	7	6	0	2
4/14	1	292	6	1	5	M	10	Mason	2	3	2	3	3	0	8	7	0	2
4/14	2	855	7	1	5	C	20	Mason	3	3	2	3	3	2	4	5	0	4
4/14	2	139	8	1	5	B	20	Mason	2	3	2	2	3	1	7	6	0	2
4/14	2	747	9	1	5	R	20	Mason	3	2	2	2	3	1	7	7	0	3
4/14	2	620	10	1	5	M	30	Mason	2	3	2	3	3	0	7	6	0	3
4/14	2	697	11	1	5	M	20	Mason	2	3	2	3	3	0	7	6	0	4
4/14	2	093	12	1	5	B	10	Mason	2	3	2	2	3	0	8	5	2	3
4/14	3	743	13	1	5	H	10	Mason	2	3	2	3	3	0	8	7	0	2
4/14	3	445	14	1	5	R	30	Mason	2	2	2	2	3	2	8	6	0	2
4/14	3	095	15	1	5	R	10	Mason	2	3	2	2	3	1	8	6	0	2
4/14	3	198	16	1	5	L	30	Mason	2	3	2	2	3	0	7	7	0	3
4/14	3	987	17	1	5	C	30	Mason	2	3	2	2	3	0	5	6	0	3
4/14	3	227	18	1	5	H	30	Mason	3	3	2	3	4	0	8	7	0	3
4/14	1	741	1	1	5	H	20	Capps	2	2	2	2	2	1	8	6	0	4
4/14	1	866	2	1	5	C	10	Capps	2	2	2	2	2	1	8	7	0	3
4/14	1	301	3	1	5	L	10	Capps	2	2	2	2	2	0	8	7	0	3
4/14	1	242	4	1	5	L	20	Capps	2	2	2	2	3	2	7	7	0	2
4/14	1	338	5	1	5	B	30	Capps	2	2	2	2	2	0	6	6	0	3
4/14	1	292	6	1	5	M	10	Capps	2	1	2	2	2	0	8	7	0	2
4/14	2	855	7	1	5	C	20	Capps	2	2	2	2	3	2	7	6	0	3
4/14	2	139	8	1	5	B	20	Capps	2	1	2	2	2	1	8	7	0	3
4/14	2	747	9	1	5	R	20	Capps	2	2	2	2	2	1	6	6	0	3
4/14	2	620	10	1	5	M	30	Capps	2	1	2	3	3	2	8	7	0	3

4/14	2	697	11	1	5	M	20	Capps	2	2	2	2	3	1	8	6	0	4
4/14	2	093	12	1	5	B	10	Capps	2	2	2	2	2	0	8	7	0	3
4/14	3	743	13	1	5	H	10	Capps	2	2	2	2	3	0	8	7	0	2
4/14	3	445	14	1	5	R	30	Capps	2	2	2	3	3	0	6	5	0	2
4/14	3	095	15	1	5	R	10	Capps	2	3	2	3	3	0	7	6	0	2
4/14	3	198	16	1	5	L	30	Capps	2	2	2	2	3	0	6	6	0	2
4/14	3	987	17	1	5	C	30	Capps	2	2	2	2	2	0	7	7	0	3
4/14	3	227	18	1	5	H	30	Capps	2	2	2	2	3	1	8	7	0	2
4/14	1	741	1	1	5	H	20	Higgins	2	2	2	2	2	0	7	6	1	4
4/14	1	866	2	1	5	C	10	Higgins	2	3	2	2	3	0	7	6	1	3
4/14	1	301	3	1	5	L	10	Higgins	2	2	2	2	2	0	7	6	1	3
4/14	1	242	4	1	5	L	20	Higgins	2	2	2	2	2	0	7	7	1	3
4/14	1	338	5	1	5	B	30	Higgins	2	2	2	2	2	0	6	6	1	3
4/14	1	292	6	1	5	M	10	Higgins	2	2	2	2	2	0	7	6	2	2
4/14	2	855	7	1	5	C	20	Higgins	2	2	2	2	2	0	8	7	0	4
4/14	2	139	8	1	5	B	20	Higgins	2	2	2	2	2	0	8	7	1	4
4/14	2	747	9	1	5	R	20	Higgins	2	2	2	2	2	0	7	6	1	3
4/14	2	620	10	1	5	M	30	Higgins	2	2	2	2	2	0	7	6	1	3
4/14	2	697	11	1	5	M	20	Higgins	2	2	2	2	3	0	7	6	2	3
4/14	2	093	12	1	5	B	10	Higgins	2	3	2	2	3	0	7	6	2	3
4/14	3	743	13	1	5	H	10	Higgins	2	2	2	2	2	0	8	7	2	2
4/14	3	445	14	1	5	R	30	Higgins	2	3	2	2	3	0	7	6	2	3
4/14	3	095	15	1	5	R	10	Higgins	2	2	2	2	2	0	7	6	2	3
4/14	3	198	16	1	5	L	30	Higgins	2	3	2	2	2	0	8	7	2	3
4/14	3	987	17	1	5	C	30	Higgins	2	3	2	2	3	0	7	6	2	3
4/14	3	227	18	1	5	H	30	Higgins	2	3	2	2	3	0	8	7	2	3
4/14	1	741	1	1	5	H	20	Runyon	2	2	2	2	2	0	7	6	0	4
4/14	1	866	2	1	5	C	10	Runyon	2	2	2	2	2	0	6	6	0	3
4/14	1	301	3	1	5	L	10	Runyon	2	2	2	2	2	0	7	7	0	5
4/14	1	242	4	1	5	L	20	Runyon	2	2	2	2	2	0	6	6	0	4
4/14	1	338	5	1	5	B	30	Runyon	2	2	2	2	2	0	6	6	0	4
4/14	1	292	6	1	5	M	10	Runyon	2	0	2	2	2	0	6	6	0	3
4/14	2	855	7	1	5	C	20	Runyon	2	2	2	2	2	0	4	5	0	4
4/14	2	139	8	1	5	B	20	Runyon	2	2	2	2	2	0	5	6	0	3
4/14	2	747	9	1	5	R	20	Runyon	2	2	2	2	2	0	6	6	0	3
4/14	2	620	10	1	5	M	30	Runyon	2	2	2	2	2	0	7	6	0	5
4/14	2	697	11	1	5	M	20	Runyon	2	2	2	2	2	0	7	7	0	3
4/14	2	093	12	1	5	B	10	Runyon	3	2	2	2	3	0	7	6	0	4
4/14	3	743	13	1	5	H	10	Runyon	2	2	2	2	2	0	6	6	0	4
4/14	3	445	14	1	5	R	30	Runyon	2	3	2	3	2	1	6	7	0	3
4/14	3	095	15	1	5	R	10	Runyon	2	2	2	3	2	0	5	7	0	4

4/14	3	198	16	1	5	L	30	Runyon	2	2	2	2	2	0	7	6	0	4
4/14	3	987	17	1	5	C	30	Runyon	2	2	2	2	2	1	6	7	0	2
4/14	3	227	18	1	5	H	30	Runyon	2	2	2	2	2	0	7	6	0	2
4/17	1	407	1	2	1	C	10	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	1	484	2	2	1	b	30	Inglis	2	2	1	2	3	0	8	6	0	2
4/17	1	357	3	2	1	h	10	Inglis	3	3	1	2	3	0	7	6	0	3
4/17	1	929	4	2	1	m	30	Inglis	2	2	1	2	2	0	8	6	0	2
4/17	1	475	5	2	1	m	20	Inglis	2	2	1	2	2	0	7	5	0	3
4/17	1	176	6	2	1	r	30	Inglis	2	2	2	2	2	0	7	5	0	2
4/17	2	802	7	2	1	m	30	Inglis	2	2	1	2	2	0	7	6	0	3
4/17	2	823	8	2	1	l	30	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	2	222	9	2	1	h	20	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	2	174	10	2	1	c	20	Inglis	3	3	1	2	3	0	8	6	0	3
4/17	2	908	11	2	1	m	10	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	2	288	12	2	1	l	20	Inglis	3	3	1	2	3	0	7	6	0	2
4/17	3	530	13	2	1	b	20	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	3	272	14	2	1	r	10	Inglis	3	3	1	2	3	0	7	5	0	2
4/17	3	469	15	2	1	c	30	Inglis	3	3	1	2	3	0	8	6	0	2
4/17	3	358	16	2	1	l	10	Inglis	3	3	1	2	3	0	8	7	0	3
4/17	3	714	17	2	1	r	20	Inglis	3	3	1	3	3	0	8	7	0	3
4/17	3	237	18	2	1	b	10	Inglis	3	3	1	3	4	0	8	7	0	2
4/17	1	407	1	2	1	C	10	Gray	3	3	2	3	3	0	8	6	0	3
4/17	1	484	2	2	1	b	30	Gray	3	3	2	3	3	0	8	6	0	2
4/17	1	357	3	2	1	h	10	Gray	3	3	2	3	3	0	7	6	0	2
4/17	1	929	4	2	1	m	30	Gray	3	3	2	3	3	0	6	5	0	3
4/17	1	475	5	2	1	m	20	Gray	3	3	2	3	3	0	7	6	0	2
4/17	1	176	6	2	1	r	30	Gray	3	3	2	3	3	0	8	4	0	3
4/17	2	802	7	2	1	m	30	Gray	3	3	2	3	3	0	7	6	0	2
4/17	2	823	8	2	1	l	30	Gray	3	3	2	3	3	0	7	6	0	2
4/17	2	222	9	2	1	h	20	Gray	3	3	2	3	3	0	7	5	0	3
4/17	2	174	10	2	1	c	20	Gray	2	2	2	2	2	0	8	6	0	3
4/17	2	908	11	2	1	m	10	Gray	3	3	2	3	3	0	7	7	0	2
4/17	2	288	12	2	1	l	20	Gray	3	3	2	3	3	0	8	6	0	3
4/17	3	530	13	2	1	b	20	Gray	2	2	2	2	2	0	8	5	0	2
4/17	3	272	14	2	1	r	10	Gray	3	3	2	3	3	0	7	6	0	2
4/17	3	469	15	2	1	c	30	Gray	3	3	2	3	3	0	8	5	0	2
4/17	3	358	16	2	1	l	10	Gray	3	3	2	3	3	0	7	7	0	2
4/17	3	714	17	2	1	r	20	Gray	3	3	2	3	3	0	8	6	0	3
4/17	3	237	18	2	1	b	10	Gray	3	3	2	3	3	0	8	7	0	3
4/17	1	407	1	2	1	C	10	Mason	2	2	2	2	3	1	6	6	0	3
4/17	1	484	2	2	1	b	30	Mason	2	2	2	2	2	2	7	6	0	3

4/17	1	357	3	2	1	h	10	Mason	2	3	2	3	3	0	8	7	2	2
4/17	1	929	4	2	1	m	30	Mason	2	3	2	2	3	1	5	6	0	3
4/17	1	475	5	2	1	m	20	Mason	2	2	2	2	3	2	7	7	0	3
4/17	1	176	6	2	1	r	30	Mason	2	2	2	2	3	2	5	5	0	3
4/17	2	802	7	2	1	m	30	Mason	2	3	2	2	3	0	7	6	0	3
4/17	2	823	8	2	1	l	30	Mason	2	2	2	2	2	1	8	6	2	3
4/17	2	222	9	2	1	h	20	Mason	2	3	2	3	3	0	8	7	0	3
4/17	2	174	10	2	1	c	20	Mason	2	3	2	2	2	1	7	6	2	3
4/17	2	908	11	2	1	m	10	Mason	2	3	2	3	3	0	8	6	0	3
4/17	2	288	12	2	1	l	20	Mason	3	2	2	2	2	2	7	6	0	4
4/17	3	530	13	2	1	b	20	Mason	3	2	2	2	3	1	7	6	0	3
4/17	3	272	14	2	1	r	10	Mason	2	3	2	2	2	2	8	6	0	2
4/17	3	469	15	2	1	c	30	Mason	2	3	2	2	3	2	7	6	0	3
4/17	3	358	16	2	1	l	10	Mason	2	3	2	2	3	0	9	7	0	3
4/17	3	714	17	2	1	r	20	Mason	3	3	2	3	3	1	7	6	0	4
4/17	3	237	18	2	1	b	10	Mason	3	3	2	3	4	0	8	7	0	
4/17	1	407	1	2	1	C	10	Capps	2	2	2	2	2	0	8	6	0	3
4/17	1	484	2	2	1	b	30	Capps	2	3	2	2	2	1	8	6	0	4
4/17	1	357	3	2	1	h	10	Capps	2	2	2	2	2	2	9	6	0	4
4/17	1	929	4	2	1	m	30	Capps	2	2	2	2	2	2	6	6	0	3
4/17	1	475	5	2	1	m	20	Capps	2	2	2	2	2	2	8	6	0	4
4/17	1	176	6	2	1	r	30	Capps	2	3	2	2	2	1	8	6	0	4
4/17	2	802	7	2	1	m	30	Capps	2	2	2	2	2	2	8	6	0	3
4/17	2	823	8	2	1	l	30	Capps	2	2	2	2	2	2	8	7	0	3
4/17	2	222	9	2	1	h	20	Capps	2	2	2	2	2	2	8	6	0	3
4/17	2	174	10	2	1	c	20	Capps	2	2	2	2	2	0	7	6	0	2
4/17	2	908	11	2	1	m	10	Capps	2	2	2	2	2	2	8	6	0	3
4/17	2	288	12	2	1	l	20	Capps	2	2	2	2	2	2	8	7	0	4
4/17	3	530	13	2	1	b	20	Capps	2	2	2	2	3	2	8	6	0	4
4/17	3	272	14	2	1	r	10	Capps	2	2	2	2	2	0	8	7	0	2
4/17	3	469	15	2	1	c	30	Capps	3	2	2	2	3	0	6	6	0	3
4/17	3	358	16	2	1	l	10	Capps	3	3	2	2	3	1	8	7	0	4
4/17	3	714	17	2	1	r	20	Capps	2	2	2	2	3	0	8	7	0	4
4/17	3	237	18	2	1	b	10	Capps	2	2	2	2	2	2	8	7	0	4
4/17	1	407	1	2	1	C	10	Higgins	2	2	2	2	2	0	6	5	1	3
4/17	1	484	2	2	1	b	30	Higgins	2	2	2	2	2	0	7	6	1	4
4/17	1	357	3	2	1	h	10	Higgins	2	3	2	2	3	0	7	6	1	4
4/17	1	929	4	2	1	m	30	Higgins	2	2	2	2	2	0	7	6	1	3
4/17	1	475	5	2	1	m	20	Higgins	2	3	2	2	3	0	7	6	1	3
4/17	1	176	6	2	1	r	30	Higgins	2	3	2	2	3	0	6	5	1	3
4/17	2	802	7	2	1	m	30	Higgins	2	2	2	2	2	0	7	6	1	3

4/17	2	823	8	2	1	l	30	Higgins	2	2	2	2	2	0	8	7	2	3
4/17	2	222	9	2	1	h	20	Higgins	2	3	2	2	3	0	8	7	1	3
4/17	2	174	10	2	1	c	20	Higgins	2	2	2	2	2	0	7	6	2	3
4/17	2	908	11	2	1	m	10	Higgins	2	3	2	2	3	0	8	7	2	3
4/17	2	288	12	2	1	l	20	Higgins	2	2	2	2	2	0	8	7	1	3
4/17	3	530	13	2	1	b	20	Higgins	2	3	2	2	3	0	8	7	1	3
4/17	3	272	14	2	1	r	10	Higgins	2	2	2	2	2	0	8	7	2	3
4/17	3	469	15	2	1	c	30	Higgins	2	2	2	2	2	0	8	7	2	3
4/17	3	358	16	2	1	l	10	Higgins	2	3	2	2	3	0	8	7	2	3
4/17	3	714	17	2	1	r	20	Higgins	2	2	2	2	2	0	8	7	2	4
4/17	3	237	18	2	1	b	10	Higgins	2	3	2	2	3	0	8	7	2	4
4/21	1	851	1	2	5	c	30	Inglis	3	3	1	2	3	0	5	4	0	3
4/21	1	594	2	2	5	m	30	Inglis	3	3	1	2	3	0	7	6	0	3
4/21	1	522	3	2	5	c	10	Inglis	2	2	1	2	2	0	7	6	0	3
4/21	1	567	4	2	5	h	20	Inglis	3	3	1	2	3	0	8	7	0	3
4/21	1	801	5	2	5	h	10	Inglis	3	3	1	2	3	0	8	7	0	3
4/21	1	836	6	2	5	r	30	Inglis	3	3	1	2	3	0	5	4	0	3
4/21	2	807	7	2	5	c	20	Inglis	2	2	1	2	2	0	7	6	0	3
4/21	2	976	8	2	5	r	10	Inglis	2	2	1	2	2	0	8	7	0	2
4/21	2	137	9	2	5	h	30	Inglis	3	3	1	2	2	0	8	7	0	3
4/21	2	904	10	2	5	r	20	Inglis	3	3	1	2	3	0	8	7	0	3
4/21	2	146	11	2	5	m	20	Inglis	3	3	1	2	3	0	8	7	0	3
4/21	2	774	12	2	5	b	20	Inglis	3	3	1	2	3	0	8	7	0	3
4/21	3	512	13	2	5	b	10	Inglis	3	3	1	2	2	0	8	7	0	2
4/21	3	906	14	2	5	m	10	Inglis	3	3	1	2	2	0	8	7	0	2
4/21	3	289	15	2	5	l	10	Inglis	3	3	1	2	2	0	8	7	0	2
4/21	3	436	16	2	5	l	30	Inglis	3	3	1	2	2	0	7	6	0	2
4/21	3	226	17	2	5	l	20	Inglis	3	3	1	2	2	0	8	7	0	2
4/21	3	859	18	2	5	b	30	Inglis	3	3	1	2	2	0	8	7	0	3
4/21	1	851	1	2	5	c	30	Gray	2	2	2	2	2	0	8	6	0	2
4/21	1	594	2	2	5	m	30	Gray	2	2	2	2	2	0	7	7	0	3
4/21	1	522	3	2	5	c	10	Gray	2	2	2	2	2	0	8	6	0	3
4/21	1	567	4	2	5	h	20	Gray	2	2	2	2	2	0	7	6	0	2
4/21	1	801	5	2	5	h	10	Gray	3	3	2	3	3	0	7	7	0	2
4/21	1	836	6	2	5	r	30	Gray	3	3	2	3	3	0	8	5	0	3
4/21	2	807	7	2	5	c	20	Gray	2	2	2	3	3	0	8	6	0	3
4/21	2	976	8	2	5	r	10	Gray	3	3	2	2	3	0	7	7	0	2
4/21	2	137	9	2	5	h	30	Gray	3	3	2	3	3	0	7	7	0	2
4/21	2	904	10	2	5	r	20	Gray	2	2	2	2	2	0	7	7	0	3
4/21	2	146	11	2	5	m	20	Gray	3	2	2	2	3	0	7	6	0	2
4/21	2	774	12	2	5	b	20	Gray	3	2	2	2	3	0	8	6	0	2

4/21	3	512	13	2	5	b	10	Gray	2	2	2	2	2	0	7	6	0	2
4/21	3	906	14	2	5	m	10	Gray	3	3	2	3	3	0	7	6	0	2
4/21	3	289	15	2	5	l	10	Gray	3	2	2	2	3	0	7	7	0	2
4/21	3	436	16	2	5	l	30	Gray	2	2	2	2	2	0	8	6	0	2
4/21	3	226	17	2	5	l	20	Gray	2	2	2	2	2	0	8	6	0	2
4/21	3	859	18	2	5	b	30	Gray	2	2	2	2	2	0	7	7	0	2
4/21	1	851	1	2	5	c	30	Mason	2	3	2	2	3	1	6	6	0	3
4/21	1	594	2	2	5	m	30	Mason	2	2	2	2	3	0	8	6	0	3
4/21	1	522	3	2	5	c	10	Mason	2	2	2	2	2	2	8	6	0	3
4/21	1	567	4	2	5	h	20	Mason	2	3	2	3	3	0	9	7	0	3
4/21	1	801	5	2	5	h	10	Mason	2	3	2	3	3	0	8	7	0	3
4/21	1	836	6	2	5	r	30	Mason	3	3	2	3	3	2	5	6	0	4
4/21	2	807	7	2	5	c	20	Mason	2	2	2	2	2	1	7	5	0	2
4/21	2	976	8	2	5	r	10	Mason	2	2	2	2	2	0	9	6	0	3
4/21	2	137	9	2	5	h	30	Mason	2	3	2	2	3	0	8	6	0	3
4/21	2	904	10	2	5	r	20	Mason	2	3	2	2	3	0	8	6	0	3
4/21	2	146	11	2	5	m	20	Mason	2	3	2	2	3	0	8	7	0	3
4/21	2	774	12	2	5	b	20	Mason	2	2	2	2	3	2	7	6	0	3
4/21	3	512	13	2	5	b	10	Mason	2	3	2	2	4	0	9	7	2	3
4/21	3	906	14	2	5	m	10	Mason	2	2	2	3	3	0	9	6	2	3
4/21	3	289	15	2	5	l	10	Mason	2	3	2	2	3	2	9	7	0	3
4/21	3	436	16	2	5	l	30	Mason	2	3	2	2	3	0	8	7	0	3
4/21	3	226	17	2	5	l	20	Mason	2	3	2	2	3	0	9	7	0	3
4/21	3	859	18	2	5	b	30	Mason	2	3	2	2	4	0	7	7	0	3
4/21	1	851	1	2	5	c	30	Capps	2	2	2	2	2	1	8	6	0	3
4/21	1	594	2	2	5	m	30	Capps	2	2	2	2	2	2	8	7	0	3
4/21	1	522	3	2	5	c	10	Capps	2	2	2	3	3	0	8	7	0	3
4/21	1	567	4	2	5	h	20	Capps	2	2	2	2	2	2	8	6	0	3
4/21	1	801	5	2	5	h	10	Capps	2	2	2	2	2	0	8	7	0	3
4/21	1	836	6	2	5	r	30	Capps	2	2	2	2	2	2	8	6	0	4
4/21	2	807	7	2	5	c	20	Capps	2	3	2	2	3	2	8	6	0	3
4/21	2	976	8	2	5	r	10	Capps	2	2	2	3	3	2	8	6	0	3
4/21	2	137	9	2	5	h	30	Capps	2	2	2	2	3	1	8	6	0	4
4/21	2	904	10	2	5	r	20	Capps	3	2	2	2	3	1	8	6	0	4
4/21	2	146	11	2	5	m	20	Capps	2	2	2	2	2	2	8	6	0	3
4/21	2	774	12	2	5	b	20	Capps	2	2	2	2	2	2	8	7	0	3
4/21	3	512	13	2	5	b	10	Capps	2	2	2	3	2	2	8	7	0	2
4/21	3	906	14	2	5	m	10	Capps	2	3	2	2	2	1	8	7	0	4
4/21	3	289	15	2	5	l	10	Capps	2	2	2	2	2	0	8	6	0	3
4/21	3	436	16	2	5	l	30	Capps	2	3	2	3	3	1	7.5	5.5	0	2
4/21	3	226	17	2	5	l	20	Capps	2	2	2	2	3	1	7	6	0	2

4/21	3	859	18	2	5	b	30	Capps	2	2	2	2	2	1	8	6	0	3
4/21	1	851	1	2	5	c	30	Higgins	2	2	2	2	2	1	8	7	1	3
4/21	1	594	2	2	5	m	30	Higgins	2	2	2	2	2	0	7	6	1	4
4/21	1	522	3	2	5	c	10	Higgins	2	3	2	2	3	0	8	7	2	3
4/21	1	567	4	2	5	h	20	Higgins	2	2	2	2	2	0	8	7	2	3
4/21	1	801	5	2	5	h	10	Higgins	2	3	2	2	3	0	7	6	1	3
4/21	1	836	6	2	5	r	30	Higgins	2	2	2	2	2	0	8	7	2	4
4/21	2	807	7	2	5	c	20	Higgins	2	3	2	2	3	0	8	7	1	4
4/21	2	976	8	2	5	r	10	Higgins	2	3	2	2	3	0	8	7	1	3
4/21	2	137	9	2	5	h	30	Higgins	2	2	2	1	1	0	7	6	1	4
4/21	2	904	10	2	5	r	20	Higgins	2	3	2	2	3	0	8	7	2	4
4/21	2	146	11	2	5	m	20	Higgins	2	2	2	2	2	0	8	7	2	4
4/21	2	774	12	2	5	b	20	Higgins	2	3	2	2	3	0	8	7	2	4
4/21	3	512	13	2	5	b	10	Higgins	2	3	2	2	3	0	8	7	1	4
4/21	3	906	14	2	5	m	10	Higgins	2	2	2	2	2	0	8	7	2	3
4/21	3	289	15	2	5	l	10	Higgins	2	2	2	2	2	0	7	6	2	4
4/21	3	436	16	2	5	l	30	Higgins	2	2	2	2	2	0	8	7	2	4
4/21	3	226	17	2	5	l	20	Higgins	2	2	2	2	2	0	8	7	2	4
4/21	3	859	18	2	5	b	30	Higgins	2	3	2	2	3	0	8	7	2	3

Date	**Session**	**S3D**	**Order**	**Rep**	**Day**	**Trt**	**Fat**	**Panel**	**After bitter**	**After brown**	**After sour**	**After sweet**	**After serum**	**After sorg**	**After metal**	**After astrin**
4/10	1	056	1	1	1	L	20	Inglis	2	0	2	0	0	0	2	2
4/10	1	77	2	1	1	B	10	Inglis	2	0	2	0	0	0	2	2
4/10	1	257	3	1	1	R	30	Inglis	2	0	2	0	0	0	2	2
4/10	1	140	4	1	1	C	10	Inglis	3	0	2	0	0	0	2	3
4/10	1	262	5	1	1	R	10	Inglis	3	0	2	0	0	0	3	3
4/10	1	393	6	1	1	H	30	Inglis	2	0	2	0	0	0	2	2
4/10	2	578	7	1	1	R	20	Inglis	2	0	2	0	0	0	2	2
4/10	2	568	8	1	1	L	30	Inglis	2	0	2	0	0	0	2	2
4/10	2	273	9	1	1	H	10	Inglis	2	2	2	2	0	0	3	3
4/10	2	766	10	1	1	B	30	Inglis	3	2	2	0	0	0	2	2
4/10	2	996	11	1	1	H	20	Inglis	3	2	0	0	0	2	3	3
4/10	2	749	12	1	1	C	30	Inglis	2	0	2	0	0	0	3	3
4/10	3	799	13	1	1	M	20	Inglis	2	0	2	0	0	0	2	2
4/10	3	071	14	1	1	M	30	Inglis	3	0	2	0	0	0	2	2
4/10	3	914	15	1	1	B	20	Inglis	3	0	2	0	0	0	2	3
4/10	3	813	16	1	1	C	20	Inglis	3	2	2	0	0	0	2	3
4/10	3	312	17	1	1	M	10	Inglis	2	1	2	0	0	0	2	2
4/10	3	517	18	1	1	L	10	Inglis	2	1	2	0	0	0	2	2

4/10	1	056	1	1	1	L	20	Gray	3	2	3	0	2	0	2	2
4/10	1	77	2	1	1	B	10	Gray	3	2	2	0	2	0	3	3
4/10	1	257	3	1	1	R	30	Gray	2	2	2	0	2	0	2	2
4/10	1	140	4	1	1	C	10	Gray	3	2	2	0	1	0	2	2
4/10	1	262	5	1	1	R	10	Gray	4	2	2	0	2	0	2	2
4/10	1	393	6	1	1	H	30	Gray	3	2	2	0	2	0	2	2
4/10	2	578	7	1	1	R	20	Gray	3	2	2	0	1	0	2	2
4/10	2	568	8	1	1	L	30	Gray	3	2	3	0	2	0	2	2
4/10	2	273	9	1	1	H	10	Gray	4	2	3	0	2	0	3	3
4/10	2	766	10	1	1	B	30	Gray	3	2	3	0	2	0	3	3
4/10	2	996	11	1	1	H	20	Gray	3	2	3	0	2	0	3	3
4/10	2	749	12	1	1	C	30	Gray	3	0	3	0	2	0	3	3
4/10	3	799	13	1	1	M	20	Gray	3	2	3	0	2	0	0	2
4/10	3	071	14	1	1	M	30	Gray	3	3	3	0	2	0	2	3
4/10	3	914	15	1	1	B	20	Gray	3	3	3	0	1	0	3	3
4/10	3	813	16	1	1	C	20	Gray	4	3	3	0	2	0	3	3
4/10	3	312	17	1	1	M	10	Gray	4	3	2	0	1	0	3	3
4/10	3	517	18	1	1	L	10	Gray	4	3	3	0	2	0	3	3
4/10	1	056	1	1	1	L	20	Mason	0	0	0	0	2	0	2	2
4/10	1	77	2	1	1	B	10	Mason	0	0	0	0	2	0	2	2
4/10	1	257	3	1	1	R	30	Mason	0	0	0	0	1	0	2	2
4/10	1	140	4	1	1	C	10	Mason	0	0	0	0	2	0	3	3
4/10	1	262	5	1	1	R	10	Mason	0	0	0	0	0	0	3	3
4/10	1	393	6	1	1	H	30	Mason	0	0	0	0	2	0	3	2
4/10	2	578	7	1	1	R	20	Mason	0	0	0	0	2	0	2	2
4/10	2	568	8	1	1	L	30	Mason	0	0	0	0	2	0	2	2
4/10	2	273	9	1	1	H	10	Mason	0	0	0	0	0	3	2	2
4/10	2	766	10	1	1	B	30	Mason	0	0	0	0	1	0	2	2
4/10	2	996	11	1	1	H	20	Mason	0	0	0	0	1	3	2	2
4/10	2	749	12	1	1	C	30	Mason	0	0	0	0	2	0	3	2
4/10	3	799	13	1	1	M	20	Mason	0	0	0	0	0	2	2	2
4/10	3	071	14	1	1	M	30	Mason	0	0	0	0	0	0	2	2
4/10	3	914	15	1	1	B	20	Mason	0	0	0	0	2	0	2	2
4/10	3	813	16	1	1	C	20	Mason	0	0	0	0	0	0	2	3
4/10	3	312	17	1	1	M	10	Mason	0	0	0	0	0	3	2	3
4/10	3	517	18	1	1	L	10	Mason	0	0	0	0	0	3	2	2
4/10	1	056	1	1	1	L	20	Capps	2	0	2	0	2	0	2	1
4/10	1	77	2	1	1	B	10	Capps	2	0	1	0	2	0	2	0
4/10	1	257	3	1	1	R	30	Capps	2	0	2	1	2	0	2	2
4/10	1	140	4	1	1	C	10	Capps	2	0	2	1	0	0	2	2
4/10	1	262	5	1	1	R	10	Capps	2	0	2	0	2	0	2	1

4/10	1	393	6	1	1	H	30	Capps	2	0	2	0	2	0	2	1
4/10	2	578	7	1	1	R	20	Capps	1	0	2	0	0	0	2	1
4/10	2	568	8	1	1	L	30	Capps	2	0	2	0	0	0	2	2
4/10	2	273	9	1	1	H	10	Capps	3	1	2	0	0	0	2	1
4/10	2	766	10	1	1	B	30	Capps	2	1	2	1	0	0	2	1
4/10	2	996	11	1	1	H	20	Capps	2	0	2	0	0	0	2	1
4/10	2	749	12	1	1	C	30	Capps	2	0	2	0	0	0	2	1
4/10	3	799	13	1	1	M	20	Capps	2	0	2	0	0	0	2	1
4/10	3	071	14	1	1	M	30	Capps	2	0	2	0	0	0	2	0
4/10	3	914	15	1	1	B	20	Capps	2	0	2	0	0	0	2	1
4/10	3	813	16	1	1	C	20	Capps	2	2	2	0	0	0	2	2
4/10	3	312	17	1	1	M	10	Capps	2	2	2	0	0	0	2	0
4/10	3	517	18	1	1	L	10	Capps	2	0	2	0	0	0	2	0
4/10	1	056	1	1	1	L	20	Higgins	2	1	1	0	0	0	2	2
4/10	1	77	2	1	1	B	10	Higgins	2	1	2	0	0	0	2	2
4/10	1	257	3	1	1	R	30	Higgins	2	0	1	0	0	0	2	2
4/10	1	140	4	1	1	C	10	Higgins	2	0	2	0	0	0	2	2
4/10	1	262	5	1	1	R	10	Higgins	3	0	2	0	0	0	2	3
4/10	1	393	6	1	1	H	30	Higgins	2	0	2	0	0	0	2	2
4/10	2	578	7	1	1	R	20	Higgins	2	0	2	0	0	0	2	2
4/10	2	568	8	1	1	L	30	Higgins	2	1	2	0	0	0	2	2
4/10	2	273	9	1	1	H	10	Higgins	2	1	2	0	0	0	2	2
4/10	2	766	10	1	1	B	30	Higgins	2	1	2	0	0	0	2	2
4/10	2	996	11	1	1	H	20	Higgins	2	1	2	0	0	0	2	2
4/10	2	749	12	1	1	C	30	Higgins	2	1	2	0	0	0	2	2
4/10	3	799	13	1	1	M	20	Higgins	2	1	2	0	0	0	2	2
4/10	3	071	14	1	1	M	30	Higgins	2	1	2	0	0	0	2	2
4/10	3	914	15	1	1	B	20	Higgins	2	1	2	0	0	0	2	2
4/10	3	813	16	1	1	C	20	Higgins	3	1	2	0	0	0	2	3
4/10	3	312	17	1	1	M	10	Higgins	2	1	2	0	0	0	2	2
4/10	3	517	18	1	1	L	10	Higgins	2	1	2	0	0	0	2	2
4/10	1	056	1	1	1	L	20	Runyon	2	0	1	0	0	0	2	2
4/10	1	77	2	1	1	B	10	Runyon	2	0	2	0	0	0	2	2
4/10	1	257	3	1	1	R	30	Runyon	2	0	1	0	0	0	2	2
4/10	1	140	4	1	1	C	10	Runyon	2	0	2	0	0	0	2	2
4/10	1	262	5	1	1	R	10	Runyon	3	0	2	0	0	0	3	3
4/10	1	393	6	1	1	H	30	Runyon	2	0	2	0	0	0	2	2
4/10	2	578	7	1	1	R	20	Runyon	2	0	2	0	0	0	2	2
4/10	2	568	8	1	1	L	30	Runyon	2	0	2	0	0	0	2	2
4/10	2	273	9	1	1	H	10	Runyon	2	0	1	0	0	0	2	3
4/10	2	766	10	1	1	B	30	Runyon	2	1	2	0	0	0	2	3

4/10	2	996	11	1	1	H	20	Runyon	2	0	2	0	0	0	2	3
4/10	2	749	12	1	1	C	30	Runyon	2	1	2	0	0	0	2	2
4/10	3	799	13	1	1	M	20	Runyon	2	1	2	0	0	0	2	3
4/10	3	071	14	1	1	M	30	Runyon	2	0	2	0	0	0	2	2
4/10	3	914	15	1	1	B	20	Runyon	2	0	2	0	0	0	2	3
4/10	3	813	16	1	1	C	20	Runyon	3	0	1	0	0	0	2	3
4/10	3	312	17	1	1	M	10	Runyon	2	0	2	0	0	0	2	2
4/10	3	517	18	1	1	L	10	Runyon	2	0	2	0	0	0	2	2
4/14	1	741	1	1	5	H	20	Inglis	3	1	2	0	0	2	3	3
4/14	1	866	2	1	5	C	10	Inglis	2	1	2	0	0	0	2	2
4/14	1	301	3	1	5	L	10	Inglis	2	1	1	0	0	0	2	2
4/14	1	242	4	1	5	L	20	Inglis	3	1	2	0	0	2	2	3
4/14	1	338	5	1	5	B	30	Inglis	3	1	2	0	0	1	3	3
4/14	1	292	6	1	5	M	10	Inglis	3	1	2	0	0	0	2	2
4/14	2	855	7	1	5	C	20	Inglis	2	0	2	0	0	2	3	2
4/14	2	139	8	1	5	B	20	Inglis	2	1	2	0	0	0	2	2
4/14	2	747	9	1	5	R	20	Inglis	3	1	2	0	0	0	2	2
4/14	2	620	10	1	5	M	30	Inglis	3	1	2	0	0	2	2	3
4/14	2	697	11	1	5	M	20	Inglis	3	1	2	0	0	3	3	3
4/14	2	093	12	1	5	B	10	Inglis	4	1	2	0	0	0	3	3
4/14	3	743	13	1	5	H	10	Inglis	3	1	2	0	0	2	3	3
4/14	3	445	14	1	5	R	30	Inglis	2	1	2	0	0	1	2	2
4/14	3	095	15	1	5	R	10	Inglis	2	1	2	0	0	0	2	2
4/14	3	198	16	1	5	L	30	Inglis	3	2	2	0	0	0	2	2
4/14	3	987	17	1	5	C	30	Inglis	3	1	2	0	0	1	2	3
4/14	3	227	18	1	5	H	30	Inglis	3	1	2	0	0	2	2	3
4/14	1	741	1	1	5	H	20	Gray	3	2	2	0	1	0	2	2
4/14	1	866	2	1	5	C	10	Gray	2	2	2	0	1	0	2	2
4/14	1	301	3	1	5	L	10	Gray	3	2	2	0	2	0	3	3
4/14	1	242	4	1	5	L	20	Gray	3	2	2	0	1	0	3	3
4/14	1	338	5	1	5	B	30	Gray	3	2	2	0	1	0	3	3
4/14	1	292	6	1	5	M	10	Gray	3	3	2	0	0	0	3	3
4/14	2	855	7	1	5	C	20	Gray	2	1	2	0	1	0	2	2
4/14	2	139	8	1	5	B	20	Gray	3	2	2	0	1	0	2	2
4/14	2	747	9	1	5	R	20	Gray	3	2	2	0	1	0	3	3
4/14	2	620	10	1	5	M	30	Gray	3	2	2	0	1	0	3	3
4/14	2	697	11	1	5	M	20	Gray	3	2	2	0	1	0	3	3
4/14	2	093	12	1	5	B	10	Gray	3	2	2	0	2	0	3	3
4/14	3	743	13	1	5	H	10	Gray	3	2	2	0	1	0	3	3
4/14	3	445	14	1	5	R	30	Gray	3	2	2	0	1	0	2	2
4/14	3	095	15	1	5	R	10	Gray	3	2	3	0	1	0	3	3

4/14	3	198	16	1	5	L	30	Gray	3	2	2	0	1	0	2	2
4/14	3	987	17	1	5	C	30	Gray	3	3	3	0	1	0	2	2
4/14	3	227	18	1	5	H	30	Gray	3	3	3	0	1	0	3	3
4/14	1	741	1	1	5	H	20	Mason	3	0	2	0	0	2	2	2
4/14	1	866	2	1	5	C	10	Mason	2	2	1	0	0	0	2	2
4/14	1	301	3	1	5	L	10	Mason	2	1	1	0	0	0	2	2
4/14	1	242	4	1	5	L	20	Mason	3	1	1	0	0	2	2	3
4/14	1	338	5	1	5	B	30	Mason	3	2	1	0	0	0	2	3
4/14	1	292	6	1	5	M	10	Mason	3	2	1	0	0	0	2	3
4/14	2	855	7	1	5	C	20	Mason	3	1	2	1	0	2	3	3
4/14	2	139	8	1	5	B	20	Mason	3	1	1	1	0	1	2	2
4/14	2	747	9	1	5	R	20	Mason	2	2	1	2	0	2	2	2
4/14	2	620	10	1	5	M	30	Mason	3	2	1	0	0	3	2	3
4/14	2	697	11	1	5	M	20	Mason	3	1	1	0	0	3	2	3
4/14	2	093	12	1	5	B	10	Mason	3	0	1	0	0	2	2	3
4/14	3	743	13	1	5	H	10	Mason	3	1	1	0	0	3	2	2
4/14	3	445	14	1	5	R	30	Mason	3	0	1	1	0	0	2	2
4/14	3	095	15	1	5	R	10	Mason	3	0	1	0	0	1	2	2
4/14	3	198	16	1	5	L	30	Mason	3	2	1	0	0	2	2	2
4/14	3	987	17	1	5	C	30	Mason	3	0	1	0	0	2	2	2
4/14	3	227	18	1	5	H	30	Mason	4	2	1	0	0	0	2	3
4/14	1	741	1	1	5	H	20	Capps	2	1	1	1	0	0	2	0
4/14	1	866	2	1	5	C	10	Capps	2	2	1	1	0	0	2	2
4/14	1	301	3	1	5	L	10	Capps	2	2	2	0	0	0	2	1
4/14	1	242	4	1	5	L	20	Capps	2	0	2	0	0	0	2	1
4/14	1	338	5	1	5	B	30	Capps	2	0	2	0	0	0	2	1
4/14	1	292	6	1	5	M	10	Capps	2	2	1	0	0	0	1	0
4/14	2	855	7	1	5	C	20	Capps	2	0	1	1	0	0	2	1
4/14	2	139	8	1	5	B	20	Capps	2	0	1	0	0	0	2	0
4/14	2	747	9	1	5	R	20	Capps	2	1	2	0	0	0	2	2
4/14	2	620	10	1	5	M	30	Capps	2	1	2	1	0	0	2	1
4/14	2	697	11	1	5	M	20	Capps	2	1	1	1	0	0	2	2
4/14	2	093	12	1	5	B	10	Capps	2	2	2	0	0	0	2	2
4/14	3	743	13	1	5	H	10	Capps	2	0	2	0	0	2	2	2
4/14	3	445	14	1	5	R	30	Capps	2	1	2	0	0	1	2	2
4/14	3	095	15	1	5	R	10	Capps	2	1	2	0	0	0	2	2
4/14	3	198	16	1	5	L	30	Capps	2	0	2	0	0	0	2	0
4/14	3	987	17	1	5	C	30	Capps	2	2	2	0	0	0	2	0
4/14	3	227	18	1	5	H	30	Capps	2	2	2	0	0	0	2	0
4/14	1	741	1	1	5	H	20	Higgins	2	1	1	0	0	0	2	2
4/14	1	866	2	1	5	C	10	Higgins	3	1	2	0	0	0	2	2

4/14	1	301	3	1	5	L	10	Higgins	2	1	2	0	0	0	2	2
4/14	1	242	4	1	5	L	20	Higgins	2	0	2	0	0	0	2	2
4/14	1	338	5	1	5	B	30	Higgins	2	0	2	0	0	0	2	2
4/14	1	292	6	1	5	M	10	Higgins	2	1	2	0	0	0	2	2
4/14	2	855	7	1	5	C	20	Higgins	2	1	2	0	0	0	2	2
4/14	2	139	8	1	5	B	20	Higgins	2	1	2	0	0	0	2	2
4/14	2	747	9	1	5	R	20	Higgins	2	1	2	0	0	0	2	2
4/14	2	620	10	1	5	M	30	Higgins	2	1	1	0	0	0	2	2
4/14	2	697	11	1	5	M	20	Higgins	2	1	1	0	0	0	2	2
4/14	2	093	12	1	5	B	10	Higgins	3	2	1	0	0	0	2	3
4/14	3	743	13	1	5	H	10	Higgins	2	1	2	0	0	0	2	2
4/14	3	445	14	1	5	R	30	Higgins	2	1	2	0	0	0	2	3
4/14	3	095	15	1	5	R	10	Higgins	2	1	2	0	0	0	2	2
4/14	3	198	16	1	5	L	30	Higgins	2	2	2	0	0	0	2	2
4/14	3	987	17	1	5	C	30	Higgins	3	2	2	0	0	0	2	3
4/14	3	227	18	1	5	H	30	Higgins	3	2	2	0	0	0	2	3
4/14	1	741	1	1	5	H	20	Runyon	2	0	2	0	0	0	2	2
4/14	1	866	2	1	5	C	10	Runyon	2	1	2	0	0	0	2	2
4/14	1	301	3	1	5	L	10	Runyon	2	0	2	0	0	0	3	3
4/14	1	242	4	1	5	L	20	Runyon	2	0	2	0	0	0	3	3
4/14	1	338	5	1	5	B	30	Runyon	2	0	2	0	0	0	2	2
4/14	1	292	6	1	5	M	10	Runyon	2	1	2	0	0	0	3	3
4/14	2	855	7	1	5	C	20	Runyon	2	0	2	0	0	0	3	3
4/14	2	139	8	1	5	B	20	Runyon	2	0	2	0	0	0	3	3
4/14	2	747	9	1	5	R	20	Runyon	2	0	2	0	0	0	2	2
4/14	2	620	10	1	5	M	30	Runyon	2	0	2	0	0	0	2	2
4/14	2	697	11	1	5	M	20	Runyon	3	1	2	0	0	0	3	3
4/14	2	093	12	1	5	B	10	Runyon	3	0	2	0	0	0	3	3
4/14	3	743	13	1	5	H	10	Runyon	2	0	2	0	0	0	2	2
4/14	3	445	14	1	5	R	30	Runyon	2	0	2	0	0	0	3	3
4/14	3	095	15	1	5	R	10	Runyon	2	0	3	0	0	0	3	3
4/14	3	198	16	1	5	L	30	Runyon	2	0	3	0	0	0	2	3
4/14	3	987	17	1	5	C	30	Runyon	2	2	2	0	0	0	2	2
4/14	3	227	18	1	5	H	30	Runyon	2	0	2	0	0	0	2	3
4/17	1	407	1	2	1	C	10	Inglis	3	1	2	0	0	0	3	3
4/17	1	484	2	2	1	b	30	Inglis	3	1	2	0	0	0	2	2
4/17	1	357	3	2	1	h	10	Inglis	4	0	2	0	0	3	3	3
4/17	1	929	4	2	1	m	30	Inglis	2	0	2	0	0	1	2	2
4/17	1	475	5	2	1	m	20	Inglis	2	1	2	0	0	0	2	2
4/17	1	176	6	2	1	r	30	Inglis	2	2	2	0	0	0	2	2
4/17	2	802	7	2	1	m	30	Inglis	2	1	2	0	0	2	2	2

4/17	2	823	8	2	1	l	30	Inglis	3	1	2	0	0	2	3	3
4/17	2	222	9	2	1	h	20	Inglis	3	1	2	0	0	2	3	3
4/17	2	174	10	2	1	c	20	Inglis	3	0	2	0	0	2	3	3
4/17	2	908	11	2	1	m	10	Inglis	3	1	2	0	0	2	3	3
4/17	2	288	12	2	1	l	20	Inglis	3	0	2	0	0	0	3	3
4/17	3	530	13	2	1	b	20	Inglis	3	0	2	0	0	2	3	3
4/17	3	272	14	2	1	r	10	Inglis	3	0	3	0	0	0	3	3
4/17	3	469	15	2	1	c	30	Inglis	3	1	2	0	0	0	3	3
4/17	3	358	16	2	1	l	10	Inglis	3	1	2	0	0	2	3	3
4/17	3	714	17	2	1	r	20	Inglis	3	0	3	0	0	0	3	3
4/17	3	237	18	2	1	b	10	Inglis	4	0	2	0	0	2	3	3
4/17	1	407	1	2	1	C	10	Gray	3	2	3	0	2	0	2	2
4/17	1	484	2	2	1	b	30	Gray	3	1	2	0	1	0	2	2
4/17	1	357	3	2	1	h	10	Gray	3	2	2	0	1	0	2	3
4/17	1	929	4	2	1	m	30	Gray	3	2	3	0	1	0	3	3
4/17	1	475	5	2	1	m	20	Gray	3	2	3	0	1	0	3	3
4/17	1	176	6	2	1	r	30	Gray	3	1	2	0	0	0	3	3
4/17	2	802	7	2	1	m	30	Gray	3	2	2	0	1	0	3	3
4/17	2	823	8	2	1	l	30	Gray	3	2	3	0	1	0	3	3
4/17	2	222	9	2	1	h	20	Gray	3	2	3	0	1	0	3	3
4/17	2	174	10	2	1	c	20	Gray	2	1	2	0	1	0	2	2
4/17	2	908	11	2	1	m	10	Gray	3	1	3	0	1	0	3	3
4/17	2	288	12	2	1	l	20	Gray	3	1	2	0	1	0	3	3
4/17	3	530	13	2	1	b	20	Gray	2	0	2	0	1	0	2	2
4/17	3	272	14	2	1	r	10	Gray	3	1	2	0	1	0	3	3
4/17	3	469	15	2	1	c	30	Gray	3	2	3	0	1	0	3	3
4/17	3	358	16	2	1	l	10	Gray	3	2	3	0	1	0	3	3
4/17	3	714	17	2	1	r	20	Gray	3	2	3	0	1	0	3	3
4/17	3	237	18	2	1	b	10	Gray	3	2	2	0	1	0	3	3
4/17	1	407	1	2	1	C	10	Mason	0	2	0	0	0	2	2	2
4/17	1	484	2	2	1	b	30	Mason	0	0	0	0	0	0	2	2
4/17	1	357	3	2	1	h	10	Mason	0	0	0	0	0	3	2	3
4/17	1	929	4	2	1	m	30	Mason	0	0	0	0	0	0	2	3
4/17	1	475	5	2	1	m	20	Mason	0	2	0	0	0	2	2	2
4/17	1	176	6	2	1	r	30	Mason	0	2	0	0	0	2	2	2
4/17	2	802	7	2	1	m	30	Mason	0	0	0	0	0	3	2	3
4/17	2	823	8	2	1	l	30	Mason	0	0	0	0	0	0	2	2
4/17	2	222	9	2	1	h	20	Mason	0	0	0	0	0	3	2	3
4/17	2	174	10	2	1	c	20	Mason	0	1	0	0	0	1	2	2
4/17	2	908	11	2	1	m	10	Mason	0	0	0	0	0	3	2	3
4/17	2	288	12	2	1	l	20	Mason	0	2	0	0	0	2	3	2

4/17	3	530	13	2	1	b	20	Mason	0	2	0	0	0	2	3	2
4/17	3	272	14	2	1	r	10	Mason	0	2	0	0	0	2	2	2
4/17	3	469	15	2	1	c	30	Mason	0	2	0	0	0	2	3	2
4/17	3	358	16	2	1	l	10	Mason	0	0	0	0	0	2	2	3
4/17	3	714	17	2	1	r	20	Mason	0	0	0	0	0	2	3	2
4/17	3	237	18	2	1	b	10	Mason	0	2	0	0	0	0	3	3
4/17	1	407	1	2	1	C	10	Capps	2	1	1	0	0	0	2	2
4/17	1	484	2	2	1	b	30	Capps	2	0	2	0	0	0	2	2
4/17	1	357	3	2	1	h	10	Capps	2	1	1	1	0	0	2	2
4/17	1	929	4	2	1	m	30	Capps	2	0	1	1	0	0	2	1
4/17	1	475	5	2	1	m	20	Capps	2	1	2	1	0	0	2	1
4/17	1	176	6	2	1	r	30	Capps	2	0	2	1	0	0	2	2
4/17	2	802	7	2	1	m	30	Capps	2	0	1	1	0	0	2	1
4/17	2	823	8	2	1	l	30	Capps	2	0	1	1	0	0	2	1
4/17	2	222	9	2	1	h	20	Capps	1	1	1	1	0	0	2	1
4/17	2	174	10	2	1	c	20	Capps	2	1	2	0	0	0	2	1
4/17	2	908	11	2	1	m	10	Capps	2	1	1	1	0	0	2	1
4/17	2	288	12	2	1	l	20	Capps	2	1	2	1	0	0	2	1
4/17	3	530	13	2	1	b	20	Capps	2	2	1	1	0	0	2	1
4/17	3	272	14	2	1	r	10	Capps	2	1	1	0	0	0	2	1
4/17	3	469	15	2	1	c	30	Capps	2	0	2	0	0	0	2	1
4/17	3	358	16	2	1	l	10	Capps	2	2	2	0	0	0	2	2
4/17	3	714	17	2	1	r	20	Capps	2	1	2	0	0	0	2	1
4/17	3	237	18	2	1	b	10	Capps	2	1	1	1	0	0	2	1
4/17	1	407	1	2	1	C	10	Higgins	2	1	2	0	0	0	2	2
4/17	1	484	2	2	1	b	30	Higgins	2	1	2	0	0	0	2	2
4/17	1	357	3	2	1	h	10	Higgins	2	2	2	0	0	0	2	3
4/17	1	929	4	2	1	m	30	Higgins	2	1	2	0	0	0	2	2
4/17	1	475	5	2	1	m	20	Higgins	2	2	2	0	0	0	2	3
4/17	1	176	6	2	1	r	30	Higgins	3	1	2	0	0	0	2	3
4/17	2	802	7	2	1	m	30	Higgins	2	1	2	0	0	0	2	2
4/17	2	823	8	2	1	l	30	Higgins	2	1	2	0	0	0	2	2
4/17	2	222	9	2	1	h	20	Higgins	3	1	2	0	0	0	2	2
4/17	2	174	10	2	1	c	20	Higgins	2	1	2	0	0	0	2	2
4/17	2	908	11	2	1	m	10	Higgins	3	2	2	0	0	0	2	2
4/17	2	288	12	2	1	l	20	Higgins	2	2	2	0	0	0	2	2
4/17	3	530	13	2	1	b	20	Higgins	3	2	2	0	0	0	2	3
4/17	3	272	14	2	1	r	10	Higgins	2	1	2	0	0	0	2	2
4/17	3	469	15	2	1	c	30	Higgins	2	2	2	0	0	0	2	2
4/17	3	358	16	2	1	l	10	Higgins	3	3	2	0	0	0	2	3
4/17	3	714	17	2	1	r	20	Higgins	2	2	2	0	0	0	2	2

4/17	3	237	18	2	1	b	10	Higgins	3	2	2	0	0	0	2	3
4/21	1	851	1	2	5	c	30	Inglis	2	0	2	1	0	2	3	3
4/21	1	594	2	2	5	m	30	Inglis	3	1	2	0	0	2	3	3
4/21	1	522	3	2	5	c	10	Inglis	2	0	2	0	0	0	2	2
4/21	1	567	4	2	5	h	20	Inglis	2	1	2	1	0	2	3	3
4/21	1	801	5	2	5	h	10	Inglis	2	1	2	0	0	3	3	3
4/21	1	836	6	2	5	r	30	Inglis	2	0	2	1	0	2	3	3
4/21	2	807	7	2	5	c	20	Inglis	2	0	0	0	0	0	2	2
4/21	2	976	8	2	5	r	10	Inglis	3	1	2	0	0	1	3	3
4/21	2	137	9	2	5	h	30	Inglis	3	1	2	0	0	3	3	3
4/21	2	904	10	2	5	r	20	Inglis	3	0	2	0	0	3	3	3
4/21	2	146	11	2	5	m	20	Inglis	3	1	2	0	0	2	3	3
4/21	2	774	12	2	5	b	20	Inglis	3	1	2	0	0	2	3	3
4/21	3	512	13	2	5	b	10	Inglis	3	0	2	0	0	0	3	3
4/21	3	906	14	2	5	m	10	Inglis	3.5	1	2	0	0	0	3	3
4/21	3	289	15	2	5	l	10	Inglis	3.5	1	2	0	0	0	3	3
4/21	3	436	16	2	5	l	30	Inglis	3.5	0	2	0	0	2	3	3
4/21	3	226	17	2	5	l	20	Inglis	3	0	2	0	0	2	0	0
4/21	3	859	18	2	5	b	30	Inglis	3	2	2	0	0	3	3	3
4/21	1	851	1	2	5	c	30	Gray	2	0	2	0	0	0	2	2
4/21	1	594	2	2	5	m	30	Gray	2	1	2	0	0	0	2	2
4/21	1	522	3	2	5	c	10	Gray	2	1	2	0	2	0	2	2
4/21	1	567	4	2	5	h	20	Gray	2	1	2	0	1	0	2	2
4/21	1	801	5	2	5	h	10	Gray	3	2	2	0	1	0	3	3
4/21	1	836	6	2	5	r	30	Gray	2	1	2	0	2	0	3	2
4/21	2	807	7	2	5	c	20	Gray	3	1	3	0	1	0	2	2
4/21	2	976	8	2	5	r	10	Gray	3	2	3	0	2	0	2	2
4/21	2	137	9	2	5	h	30	Gray	3	2	2	0	1	0	3	2
4/21	2	904	10	2	5	r	20	Gray	3	1	2	0	1	0	2	2
4/21	2	146	11	2	5	m	20	Gray	3	2	2	0	1	0	2	2
4/21	2	774	12	2	5	b	20	Gray	3	2	2	0	1	0	2	2
4/21	3	512	13	2	5	b	10	Gray	2	1	3	0	1	0	2	2
4/21	3	906	14	2	5	m	10	Gray	3	2	2	0	1	0	2	2
4/21	3	289	15	2	5	l	10	Gray	3	2	2	0	1	0	3	2
4/21	3	436	16	2	5	l	30	Gray	3	2	2	0	1	0	2	2
4/21	3	226	17	2	5	l	20	Gray	2	2	2	0	1	0	2	2
4/21	3	859	18	2	5	b	30	Gray	3	2	2	0	1	0	2	2
4/21	1	851	1	2	5	c	30	Mason	3	0	2	0	0	0	3	3
4/21	1	594	2	2	5	m	30	Mason	3	2	2	0	0	2	2	2
4/21	1	522	3	2	5	c	10	Mason	2	1	1	1	0	0	2	2
4/21	1	567	4	2	5	h	20	Mason	3	0	1	0	0	2	2	3

4/21	1	801	5	2	5	h	10	Mason	3	1	1	0	0	2	2	3
4/21	1	836	6	2	5	r	30	Mason	3	0	2	0	0	2	3	3
4/21	2	807	7	2	5	c	20	Mason	2	1	1	0	0	1	2	2
4/21	2	976	8	2	5	r	10	Mason	2	2	1	2	0	0	2	2
4/21	2	137	9	2	5	h	30	Mason	3	1	1	0	0	2	2	3
4/21	2	904	10	2	5	r	20	Mason	3	1	1	0	0	1	2	2
4/21	2	146	11	2	5	m	20	Mason	3	2	1	1	0	2	3	3
4/21	2	774	12	2	5	b	20	Mason	3	2	1	0	0	1	3	3
4/21	3	512	13	2	5	b	10	Mason	4	1	1	0	0	1	2	3
4/21	3	906	14	2	5	m	10	Mason	3	1	0	0	0	2	2	3
4/21	3	289	15	2	5	l	10	Mason	3	0	1	2	0	1	2	3
4/21	3	436	16	2	5	l	30	Mason	3	2	1	0	0	2	2	4
4/21	3	226	17	2	5	l	20	Mason	3	1	1	0	0	2	2	4
4/21	3	859	18	2	5	b	30	Mason	4	1	1	0	0	2	2	5
4/21	1	851	1	2	5	c	30	Capps	1	0	1	0	0	0	2	2
4/21	1	594	2	2	5	m	30	Capps	2	1	1	1	0	0	2	2
4/21	1	522	3	2	5	c	10	Capps	2	0	2	0	0	0	2	1
4/21	1	567	4	2	5	h	20	Capps	1	1	2	1	0	0	2	1
4/21	1	801	5	2	5	h	10	Capps	2	1	1	0	0	0	2	1
4/21	1	836	6	2	5	r	30	Capps	2	1	1	1	0	0	2	1
4/21	2	807	7	2	5	c	20	Capps	2	1	1	1	0	0	2	2
4/21	2	976	8	2	5	r	10	Capps	2	2	1	1	0	0	2	2
4/21	2	137	9	2	5	h	30	Capps	2	1	2	1	0	0	2	1
4/21	2	904	10	2	5	r	20	Capps	2	2	1	1	0	0	3	1
4/21	2	146	11	2	5	m	20	Capps	2	2	2	1	0	0	2	1
4/21	2	774	12	2	5	b	20	Capps	2	1	1	1	0	0	2	1
4/21	3	512	13	2	5	b	10	Capps	2	2	2	1	0	0	2	1
4/21	3	906	14	2	5	m	10	Capps	2	2	1	1	0	0	2	2
4/21	3	289	15	2	5	l	10	Capps	2	0	1	0	0	0	2	1
4/21	3	436	16	2	5	l	30	Capps	3	0	2	0	0	0	2	2
4/21	3	226	17	2	5	l	20	Capps	2	0	1	0	0	0	2	2
4/21	3	859	18	2	5	b	30	Capps	1	1	1	0	0	0	2	2
4/21	1	851	1	2	5	c	30	Higgins	2	1	1	1	0	0	2	2
4/21	1	594	2	2	5	m	30	Higgins	2	1	2	0	0	0	2	2
4/21	1	522	3	2	5	c	10	Higgins	3	1	2	0	0	0	2	3
4/21	1	567	4	2	5	h	20	Higgins	2	1	1	0	0	0	2	2
4/21	1	801	5	2	5	h	10	Higgins	3	2	2	0	0	0	2	2
4/21	1	836	6	2	5	r	30	Higgins	2	1	1	0	0	0	2	2
4/21	2	807	7	2	5	c	20	Higgins	3	2	2	0	0	0	2	3
4/21	2	976	8	2	5	r	10	Higgins	3	1	2	0	0	0	2	3
4/21	2	137	9	2	5	h	30	Higgins	1	1	1	0	0	0	2	2

4/21	2	904	10	2	5	r	20	Higgins	3	2	2	0	0	0	2	3
4/21	2	146	11	2	5	m	20	Higgins	2	2	2	0	0	0	2	2
4/21	2	774	12	2	5	b	20	Higgins	3	2	2	0	0	0	2	3
4/21	3	512	13	2	5	b	10	Higgins	3	1	2	0	0	0	2	3
4/21	3	906	14	2	5	m	10	Higgins	2	1	1	0	0	0	2	2
4/21	3	289	15	2	5	l	10	Higgins	2	1	2	0	0	0	2	2
4/21	3	436	16	2	5	l	30	Higgins	2	1	1	0	0	0	2	2
4/21	3	226	17	2	5	l	20	Higgins	2	1	2	0	0	0	2	2
4/21	3	859	18	2	5	b	30	Higgins	3	2	2	0	0	0	2	3

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